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Aspects of Safety in Chemical Works

IT was a welcome divergence from the usual practice that the Society of Chemical Industry adopted the procedure of arranging a discussion of papers, available to readers in advance in printed form, for their meeting on April 3. The Society is also to be congratulated upon arranging for this meeting the presentation and discussion of a number of short papers as a change from one long "set" paper. It is of vital importance to encourage the younger members to take part in the meetings of the Society. Possibly, that was not quite the object of this meeting, but it may very well lead to that object being fulfilled if one or two evenings in every session are set aside for short papers. There are societies that hold "Associates" or "Juniors" nights, and though this is not perhaps the ideal method for the S.C.I., they all have the same object in view. The younger members may be perfectly well equipped to read a full-scale paper; in that event they will no doubt do so. More often they could contribute something interesting of a short nature, but circumstances prevent them from working up the subject to any great length. This, of course, does not apply only to the Society.

The papers read on April 3 were a mixed bag, and the multiplicity of subjects makes it difficult to discuss all of them here. Accordingly it is proposed to concentrate upon the works safety aspect of certain of these papers, which have in this way a certain similarity in character to the papers recently contributed to the symposium held by the Institute of Petroleum on dangerous industrial gases and vapours. The apparatus described to the S.C.I. meeting by Mr. Brock had already been described to the Institute of Petroleum by Mr. Cox; there is, of course, no harm in that for, as we pointed out on March 25, these appliances are equally applicable to both industries and until there is more facile interchange of publication, papers read to one body are often not noticed by those who belong to others. Apparatus for the detection of inflammable gases and vapours has a wide field of application in industry and this portable apparatus may well meet a widely-felt need.

The paper contributed by Mr. Carter on pitch fume arrestment is far more important than its size would make it appear. This problem is very real, as anyone with experience of the tar industry knows full well. In principle, it appears

that pitch fume consists of small droplets which will mostly condense in an expansion chamber, but that there is present a smaller quantity of droplets too small for rapid condensation and some form of additional oil-coated surface is necessary to act as an arrestor for this material. The coke-filled tower of the South Metropolitan Gas Co. is of particular interest in avoiding that bug-bear of all who deal with inflammable liquids and gases containing hydrogen sulphide—pyrophoric iron sulphide. A whole meeting might well be devoted to the examination of occasions upon which this compound has caused, or has been suspected of causing, explosions. Mr. Herbert, in his paper to the Institute of Petroleum, pointed out that the special precautions that must be taken in the gas-freeing of storage vessels that have contained inflammable products rich in sulphur compounds that might give rise to pyrophoric iron sulphide must be such as will (a) prevent the entry of air into the tank, so far as is possible, and (b) keep the internal surfaces of the tank wet until the tank is gas-free. Might it not be suggested that flue-gas purging is the safest method of all, for the comparatively small amount of oxygen present will oxidise the iron sulphide slowly during a time when no explosion can possibly occur?

Mr. Tait suggested that displacement by cold liquid was the safest and most fool-proof method, but there is always the possibility of pockets of inflammable liquid not being removed by the water, or other liquid. The importance of adequate ventilation of plant after purging from inflammable vapours, during the time when any vessel, still or column is shut down was also emphasised, this resulting in the oxidation of the iron sulphide. It is always possible for pyrophoric iron sulphide to be "tucked away" in "dead pockets"

in the presence of hydrocarbon vapours and so to remain inactive until operation again commences.

The pyrophoric nature of certain finely divided materials comes into the picture again in Mr. Donnelly's paper on fillings for the sheaths of mercury-in-steel thermometers. Works engineers will be interested in his discovery that a paste of oil and graphite is almost as good as a mercury filling in giving rapid response to temperature variations. Oil and finely divided metals gives equally good results, but the finely divided metals may be pyrophoric, while graphite is not.

Any foreman worth his salt is very sensitive to anything which he believes will act detrimentally upon the output of his department either in quantity or quality. It is most important to take this laudable attitude into very careful consideration when formulating any new safety measure.

—R. N. Harris.

NOTES AND COMMENTS

On an Even Keel

IF the commotion staged on the Continent during the Easter holiday was intended to upset British nerves, it was a complete failure. Employers and workpeople alike declined the too obvious invitation to get into a panic, and made the most of one of the best holidays of their lives in respite from past labour and in preparation for still more strenuous tasks ahead. This steadiness of temper, observed over the widest possible area, is the best reply to the politically minded minority which proclaims, with a mixture of gloom and bloodthirstiness, the inevitability of a general war. That the average British business man does not hold this monstrous doctrine was shown by the way he buckled to on Tuesday morning, seeking orders—and getting them as before. Stock Exchanges may be jumpy, but all the other indices suggest that British trade is normal and indeed on the up grade.

A Co-ordinated Cement Selling Policy

SIR MALCOLM STEWART, chairman of Associated Portland Cement Manufacturers, Ltd., indicated at the company's meeting that his group of undertakings was seeking to work out and implement a plan to provide more effective price control. He pointed out that the cement industry had not only had to contend with over-production, but that the constant change in manufacturing process and plant called for a high rate of depreciation. A high degree of efficiency had been procured in production, but for some time there had been weaknesses in distribution and selling. He said that the liaison between his group of companies and the Tunnel Company was working well and added "What is now sought is the provision of a similar plan to benefit the industry as a whole and, as opportunity affords, the consumer. This should, of course, give a more complete control of the price at which cement is sold. More effective control, if obtained, need not of itself be a matter for objection."

Food Production

FOOD supplies in war time is a subject which has received the closest attention along with all the other ramifications of national defence, the general opinion being that storage of primary foodstuffs, in quantity sufficient for an emergency period of not more than six months, coupled with an increase in the home production of foodstuffs is the best way of safeguarding supplies. The first part of the scheme does not concern us closely here, but it is well known that the Government has caused to have stores made of some of the primary products. As regards the second part, food production, the Government announced some time ago that plans had been made for war time food production and that those plans would be put into operation when an emergency arose. Many have felt that as an increase in food production would naturally involve a considerable time factor, an early start should be made in restoring soil fertility and utilising at present unproductive grassland through an extension of the land fertility scheme (embodying lime and basic slag subsidies) which has already proved most acceptable to farmers. Others hold, and the Royal Agricultural Society has now joined their ranks, that the Government's emergency plans should be made known, so that those concerned can arrange to co-operate as efficiently as pos-

sible. While it is obvious that a totally uneconomic expansion in food production is undesirable, it is well to know what steps have to be taken if it should ever prove necessary to make such an expansion.

The Institution of Factory Managers

THE Institution of Factory Managers, Ltd. (a company limited by guarantee and not having a share capital) was incorporated in February last and a leaflet setting out the objects of the Institution has now been issued. It states that the need for the Institution has long been evident; the factory manager occupies a key position in industry, but his importance has not received proper recognition. The Institution will seek to raise the professional status of the factory manager and to ensure for him a scale of remuneration commensurate with his responsibilities and attainments. Sir Henry Fildes is the first President of the Institution, which has already obtained the support of nearly 300 managers. Candidates for membership are expected to have followed some regular course of technical training and practical experience in factory management is regarded as essential. Membership is in two grades: Fellowship and Associateship. Further information may be obtained from the Secretary-Treasurer, Ashton New Hall, Ashton-on-Mersey, Cheshire.

Brazil's Industrial Expansion

REPORTS from the American Commercial Attaché in Rio de Janeiro show that Brazil is expanding industrially, especially in the production of chemical materials. Domestic enterprises are aided by protective import duties, a depreciated foreign currency, foreign exchange restrictions, and a heightened national outlook, designed to place Brazilian industry on a more self-sufficient base, but industry is still largely dependent upon foreign sources for basic chemicals. Imports of fertilisers have declined recently, particularly imports of superphosphate, which are likely to be still further affected in the future by the exploitation of deposits of apatite at Ipanema, Sao Paulo. Experiments with this new material are said to have produced excellent results and plant construction is nearing completion. The domestic paint and varnish industry has expanded in the last few years and imports have accordingly declined. Germany supplies the bulk of the pigment imports. Brazil exports quantities of botanicals, oils, waxes and other natural products.

Annual Banquet of the Boys' Hostels Association

LORD WILLINGDON will preside at the annual banquet of the Boys' Hostels Association on April 27, to be held at the Dorchester Hotel, London. The speakers will include The Lord Privy Seal, Sir John Anderson, Lord Portal, Mr. Humfrey Grose-Hodge, Headmaster of Bedford School, Mr. Wedgwood Benn, M.P., and Lord Leverhulme, the President of the Association. The Association is now responsible for two hostels, the John Benn Hostel at Stepney and King George's House at Stockwell. It has under its care nearly three hundred working boys and the demands on its financial resources are heavy. The boys in residence, who are all in employment, make the largest contribution possible to them, but there is inevitably a deficiency which has to be made good every year. The purpose of the banquet is to broadcast an appeal to the public for support of this specially hopeful work for the welfare of boys between fourteen and eighteen years of age, who would be without homes but for the existence of the hostels.

Recent Developments in Red Lead*

By
H. D. WARD

FROM the point of view of the paint manufacturer, red lead produced by the earlier processes was far from satisfactory; the two main disadvantages experienced were:—

(1) The presence of comparatively large particles which resulted in rapid settling rate when in paint form. This necessitated frequent stirring during use, and resulted in difficulties with storage and application.

(2) The low chemical purity of the red leads which contained varying proportions of lead monoxide, litharge. It is well known that litharge reacts with linseed oil to form "lead soaps." This reaction causes rapid hardening or setting of the paint. Pure red lead, Pb_3O_4 , reacts very slowly, if at all, in linseed oil. A litharge content of about $5\frac{1}{2}$ per cent. is regarded as being the intermediate between the non-setting and less stable varieties.

The Trend of Manufacturing Developments

Developments in manufacturing processes have therefore been directed mainly towards the reduction in size of the particles. The achievement of this also facilitates the production of red leads which are practically free from litharge, because fine particles can be oxidised more completely. Coarse particles, on the other hand, become fully oxidised on the surface only, the interior containing litharge. For example, a pigment having particle size of from 2-5 m.u. may be expected to contain a minimum of about 2 per cent. litharge whereas one having particle size 5-12 m.u. will probably contain at least 7 per cent. litharge.

There are a number of grades of red lead which are now in general use and the type is dependent on the fineness and the proportions of litharge, PbO and red lead Pb_3O_4 . These are shown in the following table.

Description.	Red Lead Pb_3O_4 Contents.	Stability in paint form.
1 Setting type (BS.217 "B") ..	43% to 72%	Unstable. Used mainly for jointing purposes.
2 Ordinary type (BS.217 "A") ..	72% minimum	Poor stability. Must be used within a day or so.
3 Non-Setting (BS.217 "C") ..	93.15% minimum	Good stability.
4 Highly Dispersed type	98% approx.	Excellent stability.

Paint manufacturers have frequently expressed their views regarding the need for improvement in the technical properties of red lead when in paint form. Reductions of settling rate and reactivity are necessary to overcome the difficulties experienced in practice. Freedom from coarse particles results in the desired ease of remixing, with good results on application, after extended periods of storage.

Red lead primers are used where conditions are most severe. Irregular surfaces and sharp angles are the rule rather than the exception, in practice. The paints used are rarely freshly mixed. Under these conditions the highly dispersed product gives advantages which are more marked than with laboratory tests, using the accepted types of test panels.

The film thickness of highly dispersed red lead primers may be regulated in the same manner as with other types of red lead. At the same time it should be remembered that the function of the pigment is to inhibit rust formation, even when moisture is present in the film itself. Subsequent coats of other types of paint fulfil other requirements. Therefore, in the case of red lead, pigment concentration and contact area are more important than excluding effect, which results from high film thickness. A red lead primer will normally cover about 3,000 square feet per gallon, that is equivalent to about 16 m.u. thickness. When tinted green, the red lead

paint will cover up to 10,000 square feet per gallon with a corresponding decrease in film thickness.

To produce ordinary red lead, the metal is heated in a reverberatory furnace where it is converted into the monoxide, PbO . This is then subjected to further heating in the presence of oxygen when the red lead is formed. This process has been modified in many ways, in order to increase purity and uniformity. Highly dispersed red lead is a comparatively new product. A very interesting direct process for manufacturing this material has been introduced recently in this country.

Fig. 1 is a line diagram of the plant which shows the arrangement of the equipment.

Metallic lead is first converted into the form of vapour from which red lead is produced by contact with oxygen, under controlled conditions. The ingot lead is introduced into an electric furnace (A) where the metal becomes molten. From here it is fed through a heated tube into a vaporising furnace (B) of 3 phase arc type, capable of reaching temperatures of about $3,000^{\circ}C$. As soon as the stream of metal falls on the incandescent hearth of the furnace, it vaporises with great rapidity. An effect is given similar to that which results when water is dropped on to heated iron. The globules of boiling lead move violently, being carried, as it were, on the cushion of the vapour which is being

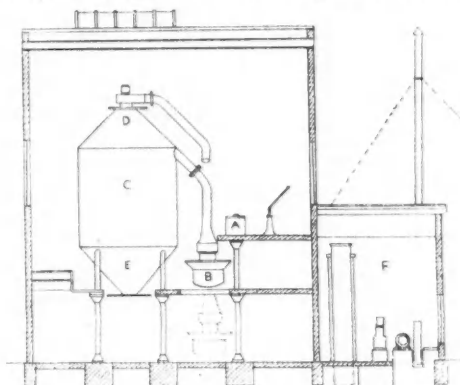


Fig. 1. Highly dispersed red lead plant.

generated. The rate at which the molten metal is fed into the furnace is controlled accurately, and is somewhat less than the maximum vaporising capacity of the furnace. This ensures an excess of heat so that the gaseous lead is superheated in a manner similar to that applied to steam.

Reacting the Lead and Oxygen Vapours

The oxygen is prepared in adjoining plant (F); air is drawn from the atmosphere and is compressed and liquefied. Oxygen is separated from the liquid air by a fractionating process, and is fed into the main chamber (C). A specially constructed fan (D) recirculates the oxygen which passes through ducts leading to the vaporising furnace. Thus, a mixture of lead and oxygen vapours pass up the vertical duct to form red lead as they cool and condense to solid form. The extremely fine particles settle in the precipitating chamber (E) where the temperature is controlled by external heating, to ensure complete oxidation.

The vaporising furnace is fitted with ducts and is, of course, the most important part of the plant. Accurate control of temperatures, pressures and feeding rates is essential in order to ensure uniformity and safety in operation. An elaborate system is employed to maintain constant conditions automatically and to record and indicate them in addition.

While the process is intended primarily for the production

* From a lecture delivered to the East Ham Oil and Colour Students' Association on March 23. The author is associated with Micro-Lead Products (Ericsson), Ltd.

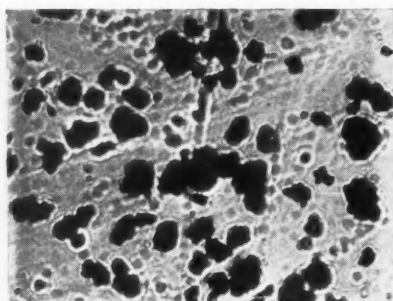


Fig. 2.

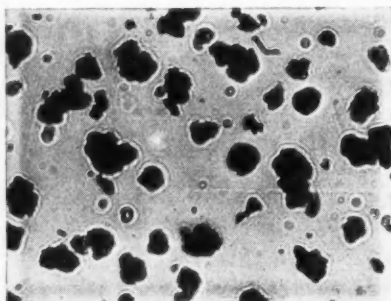


Fig. 3.

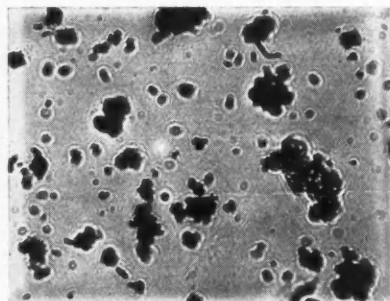


Fig. 4.

of pure highly dispersed red lead, adjustments to the temperatures and oxygen supply can be effected so that finely divided litharge is produced. If an inert gas, such as nitrogen, is substituted for the oxygen, metallic lead powder results.

The Physical Properties of Red Leads

The most striking feature which is apparent on first examination of the various types of red lead, is the comparatively large dry bulk of the highly dispersed variety. The true specific gravity of the red leads show little variation, the figure generally being taken as 9.09. In paint form therefore about 90 lb. of red lead are needed to occupy one gallon of volume.

Red leads show considerable variation in shade, depending on the method of manufacture, the purity, and the fineness of particle size. The finer grades are more orange in cast than others as a rule, but no definite conclusions may be drawn from this.

In contrast to most other pigments, no special importance is attached to the colour, because red leads are used chiefly as priming coats. It cannot be said that the appearance is attractive, by any means, and some users prefer to tone the paints with other pigments such as carbon black or iron oxide. In such cases, care must be taken to ensure that the rust inhibiting properties of the paints are not reduced.

It might be expected that the presence of litharge which is yellow would tend to render the pigment more orange, but this is not the case. The monoxide is present mainly in the centre of the coarse particles, and not on the surface; which probably explains this point.

The most important chemical test to the paint manufacturer is that carried out to determine the percentages of true red lead, and litharge. Unfortunately there are no means of estimating these directly, but a simple and reliable method is used in which the quantity of lead peroxide, PbO_2 , is determined. The procedure is detailed in B.S. Specification No. 217 and a chemically pure red lead should contain 34.89 per cent. of the peroxide. To calculate the percentage of red lead Pb_3O_4 , the peroxide figure is multiplied by 2.866.

Typical analysis of the three types of red lead are as follows:—

B.S. 217 "A."	28.8 % PbO_2	equivalent to 82.5 % Pb_3O_4
B.S. 217 Non-		
Setting.	32.84% PbO_2	" " 94.13% Pb_3O_4
Highly Dispersed.	33.8 % PbO_2	" " 96.87% Pb_3O_4

As regards other impurities, these depend chiefly on the quality of the metallic lead used as the basis for the pigment, and also upon the possibility of contamination during manufacture. Pig lead may be obtained in a very pure state. A recent analysis of the Empire produced material used in the direct process showing the remarkable figure of total impurities less than .008 per cent. The electrical vaporisation process described, which combines the lead and oxygen directly, results in great uniformity without risk of contamination.

The examination of pigments by microscope is an invaluable aid to the paint technologist who is interested not only in the

size and appearance of the particles in the dry pigment, but more deeply so in their behaviour when in the form of paint. Red lead is one of the most dense pigments in general use and the size of the particles has profound effects on the properties of the paints. Sieving tests will detect coarse material. On the other hand, the apparently coarse pigment may be solid or may consist of groups of fine particles which form conglomerates. The latter, if they are in a suitable physical condition, will become detached or dispersed when ground into paint so that the true individual size is revealed.

Fig. 2 shows ordinary red lead in the powder form, at a magnification of 1200 diameters. The particles vary in size, being mainly in the order of 10 to 15 m.u. There is a small proportion of smaller particles which are 1.5 to 2 m.u. Fig. 3 is non setting red lead to B.S. Specification No. 217. The appearance is similar, but an increased proportion of the particles are smaller, being about 6 m.u. Fig. 4 is the highly dispersed red lead in which the presence of many particles 1.5 m.u. diam. may be seen. Nevertheless, the larger areas have a size of up to 15 m.u. It will be seen, however, that they are less solid in appearance; in fact they consist of loosely adhering conglomerates of particles which are in the order of 1.5 to 2 m.u. and are uniformly and completely dispersed for all practical purposes.

At this point, a further question may be asked. Is the highly dispersed red lead specially fine in particle size as compared with other pigments in general use? As a matter of fact the product is no finer in paint form than, say, pigments such as zinc oxide, antimony oxide or a good quality white lead, which are never referred to as "highly dispersed pigments." It could therefore be said that from a comparative view point, that a red lead having a particle size of 1.5-2 m.u. is normal as far as present day general standards are concerned.

The Effects of Particle Size on Paint Properties

There could not be a more striking example to demonstrate the profound effects of particle size in relation to the technical properties of paints than those which may be observed with the different types of red lead. The more finely divided pigment which disperses readily in its vehicle shows marked difference in behaviour in a number of respects. These will be considered from a technical and practical point of view.

Settling rate.—In a comparative test conducted on paints made with highly dispersed red lead and non setting type to B.S. Specification 217, over a period of 30 days, the paints consisted of 3 parts of pigment to one part of raw linseed oil by weight and were ground under similar conditions by a triple roll mill. Fifty c.c.s. of each paint were introduced into measuring cylinders and the volumes to which the pigment level settled were observed daily and recorded graphically.

After seven days, the non setting variety showed considerable separation, the pigment level having descended to the 33 c.c. mark. The highly dispersed product, on the other hand, settled to a considerably less extent, the column showing only 2 c.c.s. of clear oil on the surface, that is, pigment

level at 48 c.c.s. After a period of one month, levels were practically stable, being:—

H.D. red lead—6½ c.c.s. clear oil—43½ c.c.s. pigments.

Non setting red lead—18 c.c.s. clear oil—32 c.c.s. pigments.

Similar tests have been carried out with paints consisting of different proportions of pigment to oil, and in each case, similar comparisons have resulted.

In practice, better pigment suspension results in less frequent need for stirring of paints during use, together with improved storage, and ease of remixing. It should be noted that in the case of red lead paints, the use of suspending agents or extenders is discouraged. Settling rate is therefore specially important in this case. It should also be remembered that coarse particles may cause difficulties when paints are actually applied, especially in the case of vertical surfaces. Red lead particles in the order of say, 10 m.u. will tend to settle rapidly in a paint film and leave streaks of pigment free oil in their track. This effect may also be observed very clearly if the parts which are painted possess sharp corners or angles. The highly dispersed red lead paint shows better covering on the edges of the work.

Hiding Power of Red Leads

Hiding Power.—Red leads possess a rather low hiding power, weight for weight as compared with other pigments as may be expected from a material having such a high specific gravity. The earlier types of coarse red leads were subjected to much criticism in this respect because of the "half painted" appearance of work on which a priming coat was applied. Much improvement has been attained, however, with the finer types of pigment.

The most notable advance is that which is shown by the highly dispersed red lead. Recent tests on this material produced by the direct process, show an increase of at least 50 per cent. hiding power by brush application, while by spraying, a 100 per cent. increase is given. This higher hiding power results in considerable improvements in the appearance of the painted work. If desired, advantage may be taken of this fact to secure economy in quantity of paint used to cover a given surface.

Oil Absorption.—The method used to determine the oil absorption of red lead is detailed in B.S. Specification No. 217. Raw linseed oil is gradually added to a weighed amount of red lead in which it is incorporated with a palette knife in the usual manner. The percentage of oil necessary to yield a coherent mass is the figure accepted as that for absorption. Ordinary red leads show a figure of between 8 per cent. and 11 per cent. of oil. The highly dispersed product, on the other hand, requires a considerably larger proportion, namely, up to 15 per cent. One reason for this is that manipulation by knife is not sufficient to detach and disperse the particles which form the conglomerates in this pigment.

An interesting effect is seen when a paste, containing about 7½ per cent. of oil (12 : 1 paste) is prepared from highly dispersed red lead and raw linseed oil. The edge runner mill is probably the most suitable type of machine for the purpose. When the required quantities of the pigment and oil are introduced simultaneously, the mixture at first forms a semi solid cake. As grinding or rather dispersion proceeds, a smooth paste results, after a brief period.

Viscosity

Viscosity.—Paints made from the more finely divided red leads are higher in viscosity than the ordinary types as will be seen from the following tables. The figures quoted are the times in seconds, used No. 4 Ford cup, temperature being 18° C.

Proportion.	2 : 1	2½ : 1
H.D. red lead ..	41 secs.	52 secs.
Non-setting red lead ..	22 secs.	25 secs.
Ordinary red lead ..	20 secs.	22 secs.

It may be argued that as this higher viscosity will need more thinning to render paints suitable for application, this will result in less weight per square foot of actual pigment on

the painted surfaces. As a matter of fact, the quantity of thinners necessary to reduce the consistency of H.D. red lead paints to the same figure as that of the other types, is small. There is a further point to be taken into consideration, namely, stability of viscosity. After 24 days the non-setting paint measured 420 secs. and the H.D., 440 secs. Apart from this, the relation of particle size and dispersion to viscosity is a general one which applies to most pigments. The advantage of fineness far outweighs any possible disadvantage, excepting in special circumstances, such as with fillers or paints used for similar purposes.

Reactivity of Red Leads.—There are a number of factors which have an effect on the rate of lead soap formation in paints made from linseed oil and red lead. These compounds result chiefly from the combination between the litharge present and the fatty acids in the oil—to state the reaction in the most simple manner. It is an extremely difficult matter to forecast accurately the rate at which the metallic soaps will be formed. The following are the main factors which are generally accepted.

1. The proportion and form of the litharge present in the red lead. Naturally, if the monoxide is present in the centre of the particles, it will be less reactive than if it were on surface. Again, a mechanical mixture of say 65 per cent. Pb₃O₄ and 35 per cent. PbO is more reactive than a red lead containing 35 per cent. litharge, present chiefly in the centre of the particles.

2. A red lead consisting of fine particles presents a larger area, weight for weight than the coarser varieties. Given the same content and disposition of litharge, the rate of reactivity is therefore higher.

3. The rate of lead soap formation increases with temperature. The paints are sometimes subjected to a heating test to determine the relative reactivity more quickly than under normal conditions. Exposure to light appears to encourage lead soap formation in painted films.

Disadvantages of High Reactivity

Red lead paints having high reactivity possess marked disadvantages. These are:—

1. The rapid setting of the pigment due to the gel formation which renders the paint difficult, or even impossible to remix. Storage periods are limited, to the great disadvantage of the paint manufacturer and his distributors.
2. Loss of hiding power and poor dispersion on remixing.
3. Increase in viscosity, as the oil becomes thickened by the presence of the soluble lead compounds.

One further point is specially noteworthy. It is that the formation of lead soaps is not so detrimental proportionately, with the highly dispersed red leads. This is considered to be due to the thinner envelopes of gel surrounding the particles. For example, a H.D. paint containing say 15 per cent. lead soap, based on the oil content may be mixed by hand, readily, to a condition which appears to be the same as the freshly ground product. A similar paint with coarser red lead, on the other hand, having 15 per cent. lead soap content would give great difficulty in remixing.

Examples of recent analyses are shown in the following tables:—

Red Lead Pastes 9 : 1	
after 90 days, normal temperatures.	
Type.	% lead in oil.
Highly Dispersed ..	5.2%
Non-Setting ..	12.6%
Ordinary ..	22.2%
Red Lead Paints 2 : 1	
after 20 days 95° Fah., 8 hrs. per day.	
Type.	% Lead in Oil.
Highly Dispersed ..	0.72%
Non-Setting ..	3.3%
Ordinary ..	5.4%
H.D. + 10% PbO ..	6.4%
H.D. + 20% PbO ..	7.2%
Red Lead Pastes 12 : 1	
180 days normal temperature.	
Type.	% Lead in Oil.
Highly Dispersed ..	11.1%
Non-Setting ..	20.3%

It is interesting to note that this type of highly dispersed red lead is less reactive than the non-setting material, because of the exceptionally low litharge content. This results in a very slow setting rate, with remarkable ease in remixing. Paints made with this finely divided pigment may be stored safely for considerable periods. After 18 months or more, they may be remixed with little effort and are practically equal to the freshly mixed paints.

Low reactivity also results in increased stability of viscosity, to which earlier reference has been made. Here are a number of measurements taken on the various types of red lead, together with paints in which various proportions of litharge had been incorporated. In each case the paints consisted of $\frac{1}{2}$ parts pigment to 1 part raw linseed oil by weight. The times given are number of seconds using No. 4 Ford cup, normal temperature, 18°C.

	As mixed.	After 45 days
H.D. Red Lead ..	56 secs.	58 secs.
Non-setting ..	21 secs.	46 secs.
Ordinary ..	20 secs.	48 secs.
H.D. + 10% PbO ..	34 secs.	128 secs.
H.D. + 20% PbO ..	30 secs.	152 secs.

Red Lead Pastes.—A relatively small increase in viscosity is sufficient to render a stiff paste too hard to remix by hand, or even by machine. Red leads which give low rate of soap formation are therefore most suitable for this purpose. The safe storage periods for the products are therefore greater with the more pure red leads. High temperatures accelerate

soap formation and thus advance the hardening of the pastes. An interesting point in connection with the highly dispersed red lead is that the low setting rate and high apparent bulk, permit the successful production of pastes containing as much as 1 part raw linseed oil to 6 parts of pigment by weight. The less concentrated products are very suitable for long storage periods or for shipment to tropical countries.

Vehicles for Red Lead Paints and Primers

It is generally agreed that raw linseed oil, or mixtures of raw and boiled linseed oil are the most suitable vehicles for red lead. The more finely divided red leads which have good dispersing qualities and low reactivity permit more scope in formulation. For example very interesting results have been obtained using long oil varnishes (of linseed oil synthetic resin type) of red lead paints, to obtain increased hardness and flow. Chlorinated rubber and the highly polymerised primer bases are other examples of vehicles which are receiving attention. The highly dispersed red lead thus opens a new field for development by the paint manufacturer.

Red lead, linseed oil pastes have good drying properties and need but little assistance by further additions of driers. This is due mainly to the low oil content of the paints and to the fact that the lower fatty acids produced when the film oxidises, are neutralised. The pigment has a low oil absorption for driers but the general formation of lead soaps in storage appears to retard drying rate somewhat.

Feed-Water for High Pressure Boilers

The Chemical Treatment at I.G. Works

RECENT developments in the chemical treatment of the feed-water for high pressure steam boilers at the Ludwigshafen works of the I.G. are described by Wesly (*Chem. Fabr.*, 1939, 12, 11/12, 137-142). In order to treat raw water derived from cooling systems, and having a temperature as high as 97°C., it was found necessary to dispense with the use of permittite for partial softening, as the maximum permissible temperature with this agent was 38°. The newer procedure is to remove first the carbonate hardness by means of lime, and then the sulphate (permanent) hardness with tri-soda phosphate, which precipitates the calcium as the very insoluble normal phosphate. The oxygen content of the water is then removed by means of SO_2 .

Removal of Dissolved Silica

Special attention has been paid to the removal of dissolved SiO_2 , which reached concentrations as high as 60 mg/litre in the boilers, and found its way into the turbines through the steam, producing undesirable deposits on the blades. The source of this silica is thought to have been fine sand in the raw water, which was dissolved by the strongly alkaline phosphate or the lime used in removal of hardness. The precipitation of the silica has been achieved as magnesium silicate by the addition of 60 mg/litre of magnesium to the water immediately after the removal of temporary hardness; the precipitate is allowed to settle in large tanks and then the supernatant liquid treated with tri-soda phosphate for the removal of permanent hardness. The water is finally filtered through a bed of magnesia and calcium carbonate, produced by the partial burning of dolomite. In this way the SiO_2 content of the feed water has been reduced from 5.6mg/l. to about 0.5mg/l., that of the boiler water to about 15mg/l., while the silica content of the steam is practically negligible, and deposition on the turbines no longer occurs. Previously the SiO_2 content of the steam ran as high as 1.5mg/l. The solid content of the steam is about 4.8mg/l., of which 75 per cent. is alkali metal salts, while the remainder is made up of calcium salts and silica. In order not to exceed this figure, which would cause deposition of soluble salts in the turbine, the alkalinity of the boiler water, which appears to be a determining factor, is very carefully controlled.

The Safe Use of Solvents

Some Practical Considerations

THE increasing and wide-spread use of solvents has brought in its train certain problems connected with the health and safety of those who use them. These problems were discussed by Mr. F. W. Clark, of British Industrial Solvents, Ltd., in a paper which he read at the National Safety First Association's Industrial Safety Conference. The following are a few extracts from his paper:—

Never let the building in which solvents are made, or put into process, be used as a store either for raw materials or finished products, but keep within the building only those quantities of both which are actually in process. Arrangements should always be made for outside storage of solvents either above or under-ground. The latter is to be preferred as being much safer in the event of fire, and for other obvious reasons, in these stirring times. From the storage tanks solvents may be pumped to measuring vessels situated in the process building. Small motor-driven (direct coupled) pumps situated outside the building, and controlled by switches inside the building are very satisfactory.

Solvents of Unknown Composition

Many solvents of unknown composition come from the continent, and while, for the sake of safety, it is desirable that the user should know their composition, it is often not possible to obtain this information. One suggestion is that British manufacturers of solvents should be asked to offer substitutes for the foreign materials and to give the composition of such substitutes.

Particular care should be taken when new solvents are used. This advice may seem superfluous, but the fact remains that in certain instances failure to take precautions has injured the health of those working with the products, sometimes with fatal results.

If efficient ventilation is ensured the risk of trouble of any kind is reduced to a minimum. All who have worked in laboratories know that the efficiently ventilated "stink cupboard" allows one to work with any toxic gas in perfect safety. If, when dealing with solvents, care is taken to ensure that ventilation is adequate, it will not be necessary to consider the possible ill-effect of the products on the operatives.

Industrial and Engineering Chemistry

Abstracts of Papers Read at the April Meeting of the American Chemical Society

SEVERAL papers of general interest in industrial and engineering chemistry were presented at the April meeting of the American Chemical Society held at Baltimore, Maryland, last week. Abstracts of these papers follow.

Alkali Silicates of 1 to 1 Ratio and Higher. Foster Dee Snell (Foster Dee Snell, Inc., Brooklyn, N.Y.).

Metasilicates and more alkaline silicates have been known for over a hundred years. Commercial production of the sodium compounds has been comparatively recent, the metasilicate since about 1930 and the sesquisilicate and orthosilicate even more recently. In general the alkaline silicates are made by addition of caustic alkali to more siliceous silicates or to silica, although theoretically some can be produced from fusion of silica and the corresponding alkaline carbonate. The pH values obtainable are strikingly high and can most readily be appreciated in terms of actual concentration of hydroxyl ion. The numerous applications reviewed include cleaning of metal surfaces, glass, fabrics, heavy-duty floors, and a multitude of other uses.

A Metaphosphate of High Fertiliser Value

Potassium Metaphosphate, a Potential High Analysis Fertiliser Material. S. L. Madorsky and K. G. Clark (Bureau of Chemistry and Soils, U.S. Department of Agriculture, Washington, D.C.).

The reaction between potassium chloride and phosphoric acid was investigated over the range 300° to 900° C. The products obtained varied in composition and physical properties with the relative proportions of reactants and with the temperature of preparation. Products prepared from equimolecular quantities of potassium chloride and phosphoric acid at 700° C. and above contained but little chlorine and free acid, were low in moisture absorption capacity at room temperature up to relative humidities of 81 per cent., and contained from 87 to 98 per cent. of their potassium and phosphorus contents as water-insoluble potassium metaphosphate. This metaphosphate is soluble in ammonium oxalate and ammonium citrate solutions and thus represents an exceptionally high concentration, 39.87 per cent. potassium oxide (K_2O) plus 60.13 per cent. phosphoric oxide (P_2O_5), of available plant food. The pure high-temperature form of potassium metaphosphate was found to consist of fibrous crystals melting at 806.8° C. with a density of 2.393 and an apparent solubility in water of 0.041 gram per litre, at 25° C., respectively.

The Utilisation of Aliphatic Nitro Compounds. I. The Production of Amines. II. The Production of Oximes. Kenneth Johnson with Ed. F. Degering (Purdue University, Lafayette, Ind.).

Recent developments in the vapour-phase nitration of the paraffin hydrocarbons by Hass and co-workers have indicated that the nitroparaffins may be cheap and important raw materials. In this study, all the nitroparaffins available from the nitration of butane, isobutane, and propane have been reduced to the corresponding amines by the use of iron and hydrochloric acid and by catalytic hydrogenation. These processes produce good yields of easily purified products, and require only simple technique and standard apparatus except for the Parr bomb required for the hydrogenation. The results obtained indicate that primary, secondary, and tertiary nitro compounds can be reduced to give almost quantitative yields of the corresponding amines. The conversion of nitroparaffins to oximes gives, in general, rather low yields due to the simultaneous formation of the amines.

Detergents from Kerosene. I. The Alkyl Sulphates. A. R. Padgett with Ed. F. Degering (Purdue University, Lafayette, Ind.).

Sodium alkyl sulphates have been prepared from kerosene.

These have been compared with similar compounds of known structure by means of a foam test and an interfacial tension test. The sodium alkyl sulphates have been prepared from all of the straight-chain dodecanols and have been similarly tested. It has been found that the sodium alkyl sulphates from secondary alcohols, although fair detergents on the basis of foam and interfacial tension tests, are not comparable in value to the same derivatives from primary alcohols, and that the derivatives obtained from kerosene are inferior to similar compounds with a terminal polar group.

Pentachlorophenol as Wood Preservative

Pentachlorophenol for Wood Preservation. T. S. Carswell and Ira Hatfield (Monsanto Chemical Co., St. Louis, Mo.).

Inherent differences in wood being manufactured into lumber to-day coupled with more severe use conditions, call for the production of a suitable new wood preservative. Changes in architectural designs, the tendency to "finish" and heat basements, and the advent of air conditioning makes it imperative that wood be amply protected against decay and termites. Pentachlorophenol in suitable solvents has been found to exhibit valuable protective qualities when properly applied to wood and wood products. Treatments using suitable solvents have not adversely affected fabrication or the "paintability" and "puttyability" of the treated wood.

Effect of Sulphur upon the Physical Properties of Paving Mixtures. Isaac Bencowitz (Texas Gulf Sulfur Co., Newgulf, Texas).

The properties of paving mixtures composed of sand, mineral filler, and asphalt are compared with those of mixtures which contain, besides asphalt, an equal weight of sulphur. The sulphur, as well as the asphalt, is added in the molten state when the mixtures are made. The laboratory tests indicate that with asphalts of 30 to 35 penetration at 25° C. the presence of sulphur yields mixtures of much higher stability than it is possible to obtain with mixtures without sulphur. This increase in stability at 60° C. is not accompanied by any increase in the brittleness at -4° C. With softer asphalts the effect due to the presence of sulphur is reduced. With asphalts of 50 penetration at 25° C. the change in the properties due to sulphur is significant. With asphalts of 60 penetration at 25° C. the presence of sulphur reduces the proportion of mineral filler required to yield mixtures of a suitable stability and void percentage.

Sections of highways paved with mixtures containing sulphur are in very good condition after one to two and a half years in service. The effect due to sulphur is especially noteworthy because of the fact that the aggregate used was admittedly unsatisfactory for asphalt pavements without sulphur.

Efficiency of a Rotary Distillation Column

Efficiency of a Rotary Distillation Column. Beveridge J. Mair and Charles B. Willingham (National Bureau of Standards).

Determinations of the height equivalent to a theoretical plate (H.E.T.P.), holdup, and through-put were made on a rotary distillation column of the Pegram-Urey-Huffman type having a rectifying section 56 cm. long and 5.08 cm. in diameter. Using as rotary members (1) baskets with fine holes, (2) flat plates, and (3) cones, tests of separating efficiency were made at speeds of rotation ranging from 250 to 1,500 r.p.m., and through-puts ranging from 1 to 10 ml. of liquid per minute. The binary system methylcyclohexane-*n*-heptane was used as the test mixture. The lowest H.E.T.P. was obtained with the conical rotating members spaced 0.64 cm. apart, with

which the following average results were obtained: H.E.T.P., 1.04 cm.; holdup, 1.3 to 1.6 ml. of liquid per theoretical plate; maximum through-put, 10 ml. of liquid per minute. Within the reproducibility of these experiments, there was no variation in H.E.T.P. for values of through-put from 2 to 10 ml. of liquid per minute and speeds of rotation from 250 to 1,500 r.p.m.

Liquid-vapour Equilibrium Relations in Binary Systems Pressure-Volume-Temperature-Composition Relations in the Ethane-n-Butane System and Pressure-Volume-Temperature Relations for n-Butane. W. B. Kay (Standard Oil Co.).

The P-V-T-X relations at the liquid and vapour phase boundaries in the ethane-n-butane system have been worked out from measurements on a series of mixtures varying in composition from pure ethane to pure n-butane. The T-X diagrams of the co-existing liquid and vapour at constant pressure were constructed and a comparison was made with those computed by means of the solution laws. The results indicate definitely that the solution laws are quite inadequate for calculating these relations at high pressure. Vapour-liquid equilibrium constants were obtained for ethane and n-butane. Information on the effect of composition as well as temperature and pressure on the equilibrium constants of ethane is given by a comparison of the constants for ethane dissolved in n-butane and for ethane dissolved in n-heptane. P-V-T relations for n-butane have been determined over the temperature range from 100° to 600° F. and over the pressure range from 35 to 1,200 pounds per square inch.

Neoprene for Lining Chemical Plant

Adhesion of Neoprene to Metal. Dr. Felix L. Verzley (E. I. du Pont de Nemours and Co., Wilmington, Del.).

Recent experimental work at the du Pont rubber laboratory has shown that neoprene can be adhered almost integrally to a wide variety of metals. This matter of adhesion between neoprene and metal is important in a wide variety of applications, such as in linings for industrial chemical equipment. The superior resistance of neoprene to certain chemicals makes it highly desirable as a lining for chemical equipment such as electroplating baths, storage tanks, pipe lines, etc. For applications of this sort a method of adhesion has been developed employing combination cements of chlorinated rubber and neoprene. The chlorinated rubber and neoprene in the proper proportions are dissolved in benzene or some similar solvent and are then painted on the metal surfaces. A cement of neoprene is then applied over this film and it is a simple matter to adhere sheets of unvulcanised neoprene to the surface. Usually the linings in large equipment of this sort are vulcanised by filling the equipment with hot water for several hours. Under these conditions the adhesion developed by the use of the chlorinated rubber cement is made more permanent by vulcanisation of the neoprene.

Casein Plastics. Dr. George H. Brothier (U.S. Regional Soybean Industrial Products Laboratory, Urbana, Ill.).

Technically, the attempts to improve the process of manufacture of casein plastic material have followed two lines, namely, shortening the time of hardening by the incorporation of a salt such as ammonium chloride in the powdered casein, and substitution of a dormant hardening agent for the formaldehyde bath. The object of these attempts was to permit the plastic to flow to shape in forms and then have the hardening agent become active and harden the protein material without the necessity of removing it and bathing it in formaldehyde. So far as can be determined, none of the experiments was sufficiently successful to warrant a commercial development. Recently it has been found that it is possible to produce a thermoplastic formaldehyde-hardened protein material that may be formed to shape under the influence of heat and pressure and come finished from the die. The protein powder is treated with a 40 per cent. formalin solution so adjusted with alkali that the pH of the equilibrium solution over the protein will be that of the isoelectric point of the protein. The excess formaldehyde is washed out with

water and the formaldehyde-protein powder dried to normal moisture content or less.

This development is not of as great commercial importance as it would have been ten years ago. As the plastics industry is operated to-day, the only thermoplastic material of any interest or importance must lend itself to application of injection moulding. Thermoplastic formaldehyde-hardened casein material is not sufficiently fluid to work in an injection machine and to date a plasticiser has not been found that will render it applicable. Here is a field of very worth-while research and one that promises an ample reward for successful efforts. Casein plastics could compete very favourably with cellulose acetate as far as colour range is concerned. In case a plasticiser could be discovered that would also improve the water resistance, casein plastics might very well be brought to a practical comparative basis for most applications, and applications not as yet considered would be possible because of the cheaper material.

Many attempts have been made to combine casein with phenolic or urea resinous moulding compounds, largely in the capacity of filler material. Recent experiments, the results of which have not yet been published, indicate that the thermoplastic formaldehyde-hardened protein may be modified advantageously with either phenolic or urea resins to produce thermosetting moulding powders of considerable potential commercial interest. Mixtures of 50 per cent. formaldehyde-hardened protein with a moisture content of 3 per cent. or less, compounded with 25 per cent. phenolic resin and 25 per cent. wood flour may be pressed at a temperature of 330° F. and 2,000 lb. per sq. in. pressure into unit pieces having good strength and quite closely resembling the regular phenolic material in appearance, except that they are translucent. A good range of colours is possible.

The hardened protein material mixed fifty-fifty with urea resin in place of alpha cellulose, commonly used as filler, produces a good moulding powder which is also thermosetting. The moulded pieces are translucent, may be produced in any colour or shape except pure white, and have a water absorption of about 2 per cent. The pieces do not soften or swell in water nor do they fracture on drying. An interesting and difficult chemical problem will have to be solved, however, before this application can have any commercial importance. The problem referred to arises from the fact that the formaldehyde-hardened protein gives a definite acid reaction when suspended in water. It has not yet been possible to neutralise the acid reaction of the hardened protein without the addition of so much alkali that the nature of the hardened protein has been adversely affected.

Sulphur Compounds as Fungicides and Bactericides

The Fungicidal and Bactericidal Action of Certain Organic Sulphur Compounds. Dr. Edward L. Everitt and Dr. M. X. Sullivan (Chemo-Medical Research Institute, Georgetown University, Washington, D.C.).

In a study of the relation of sulphur and sulphur compounds to health and disease some fifty organic sulphur compounds were tested for their fungicidal and bactericidal action. Leaving out consideration of a number of organic sulphur compounds that greatly delay the growth of the moulds, *Fusarium oxysporum*, *Fusarium lycopersicum*, and *Aspergillus fumigatus* and of virulent bacteria such as *Streptococcus hemolyticus*, and those which are effective in preventing growth but are highly toxic to man, it may be said that two compounds were found very effective in preventing both the growth of the moulds and the streptococci. These compounds are phenylbenzothiazole and especially mercaptobenzothiazole. This latter compound in flask culture experiments is much superior to sulphanilamide in inhibiting the growth of the moulds and the streptococci. As far as tests with living animals have been made, the amount necessary to inhibit the micro-organisms in the test tube, and in fact several times more, has manifested no injurious action when given by mouth or injected.

Plastics

Their Past Development, Present Application and Future Trend

MR. H. V. POTTER, B.Sc., F.I.C., M.I.Chem.E., managing director of Bakelite, Ltd., in an address on March 31 to the Plastics Group and the Liverpool Section of the Society of Chemical Industry on "In the Trail of Plastics," said that the first plastic of which there was any knowledge was bitumen. It was still used to-day on account of its water and acid resisting properties and it continued to hold the field for cheapness compared with other plastics. As the forerunner of the present moulding industry, bitumen laid the trail.

In 1865 celluloid was patented as the results of efforts by Parks to produce transparent horn. The disadvantage of celluloid, its inflammability, promoted a great deal of research to overcome this trouble. Cellulose acetate provided the successful solution to the quest for non-inflammable celluloid and this material has now a wide field for use for artificial silk and in various industries. Casein provided the next link in the chain of the present day plastics industry, this being developed in pre-war years, as were also the phenol resinoids which had been largely responsible for the rapid growth of the industry since the war. Before the war the most important uses for phenol were for the dye, pharmaceutical and propellant industries and ample supplies were available from natural resources. Later, the destructive distillation of coal solely for its aromatic constituents was found to be uneconomical and the supply became dependent upon the quantity of gas and coke produced. For the first time, in 1937, the demand for phenol exceeded the natural supply and a synthetic plant was established. Increased production of phenolic resinoids in this country caused still further demands to be made for phenol with the result that prices fluctuated to an alarming extent. The position was stabilised by the increased output of the synthetic plant; the increased supplies of phenol available to-day could be attributed to the four following reasons:—(1) Increase in coke ovens, (2) increase in synthetic plant, (3) new sources from hydrogenation of coal, and (4) better extraction from waste liquor.

The difficulty of producing water white sheet material from phenolic resinoids led to the development of urea plastics in 1924 and, later, the vinyl, styrol and acrylic resins.

The conversion of sawdust into wood flour, Mr. Potter continued, provided an example of the manner in which the resinoid plastics had beneficially affected other industries. Sawdust was formerly burned in steam raising plant while to-day between 7,000 and 10,000 tons annually are ground, sifted and refined for use as a filler in the production of moulding materials. The plastics industry was one of the largest users of formaldehyde.

Plastics had undoubtedly assisted in the raising of the standards of ordinary people. The cheapness with which moulded articles could be produced enabled them to take their place in the poorest homes and they would therefore play their part in the development of good taste and artistic appreciation. These factors would become far more important in the near future. Much larger mouldings were now being produced, and the prospect of furniture made from plastics was well within reach. Plastics were now making an important contribution to the materials of the aircraft industry. The introduction of special forms of textile material to give increased strength when moulded had led to the hollow-moulded airscrew blade and experiments were being conducted to produce moulded fuselages and wings. There could be little doubt that these would be manufactured within the near future. A good deal of work had already been done in the strengthening of wood members with phenolic resinoids and plywood had been greatly improved by use of phenolic adhesive for the plies.

(Continued at foot of next column.)

Chemical Matters in Parliament

Calcium Carbide

IN the House of Commons on April 4 Mr. Ellis Smith asked the President of the Board of Trade whether his attention had been directed to the national need of calcium carbide, to the wide range of products that could be made from calcium carbide, to the need for the production of alcohol for industrial purposes, to the potential capacity for making industrial alcohol, and the wide range of substances to be obtained by the application of the scientific treatment of coal and the development of its by-products; and what action was he taking to deal with this need?

The President of the Board of Trade (Mr. Oliver Stanley) replied that he was aware of the importance of calcium carbide and of the wide range of products which could be made from it. Some of those could be and were being made in this country from other materials. Considerable attention had been paid in recent years to the scientific treatment of coal and the development of its by-products. Where possible the Government had assisted in this work, as, for instance, in the Finance Act of last year, which implemented the principal recommendation of the Falmouth Committee on Oil from Coal, namely, the continuation for a period of 12 years of the guaranteed preference on home-produced oils.

Mr. E. Smith asked the President of the Board of Trade whether his attention had been directed to the importation of 70,000 tons of calcium carbide last year; that the world demand and production was steadily increasing; that the needs of this country were increasing, and, in view of this, what action had been taken to meet this demand and what further action was contemplated?

Mr. Stanley replied that he was aware of the importance of calcium carbide to their industries, but had no information of any difficulty in meeting the demand. The Government would, of course, welcome any well-considered plan for the production of this material in the United Kingdom. He later added that he had recently been in communication with local authorities and others about a scheme for the production of calcium carbide.

ELECTIONS TO THE COUNCIL OF THE CHEMICAL SOCIETY

The following were elected to vacancies on the Council of the Chemical Society at the recent annual meeting: President, Sir Robert Robinson, M.A., D.Sc., LL.D., F.R.S.; treasurer, Mr. F. P. Dunn, B.Sc., F.I.C.; secretary, Professor G. M. Bennett, M.A., Sc.D.; vice-president who has filled the office of president, Professor F. G. Donnan, C.B.E., D.Sc., F.R.S.; vice-presidents who have not filled the office of president, Professor I. M. Heilbron, D.S.O., D.Sc., F.R.S., Dr. J. Kenyon, F.R.S., Professor E. K. Rideal, M.B.E., D.Sc., F.R.S., and Professor S. Sugden, D.Sc., F.R.S.; elected ordinary members of council, Mr. E. J. Bowen, M.A., F.R.S., Professor H. T. S. Britton, D.Sc., F.I.C., Professor J. E. Coates, O.B.E., D.Sc., Dr. H. J. T. Ellingham, A.R.C.S., F.I.C., Professor A. Findlay, M.A., D.Sc., Professor E. L. Hirst, D.Sc., F.R.S., Professor J. Kenner, D.Sc., F.R.S., Professor H. L. Riley, D.Sc., A.R.C.S., and Professor A. R. Todd, D.Sc., D.Phil.

(Continued from preceding column.)

It was difficult to predict with any accuracy the future trend of plastics, Mr. Potter concluded. One of the most important requirements from the industrial viewpoint was to develop a resinoid having far greater physical strength and elastic properties. Research was being conducted to this end and must eventually prove successful. The limit had almost been reached for increasing the mechanical strength of plastics by the introduction of fillers. If and when this new resinoid was developed the potentialities of plastics for structural work would be almost unlimited.

Society of Public Analysts and Other Analytical Chemists

Election of Members—Abstracts of Papers Read

At an ordinary meeting of the Society of Public Analysts and Other Analytical Chemists held at Burlington House on April 5, the President, Professor W. H. Roberts, in the chair, the following were elected members of the Society: H. A. Frediani, Ph.D., B.A., M.S., and B. S. Platt, Ph.D., M.B., Ch.B.

The following three papers were then presented and discussed:

Food Inspection and Analysis in Holland. By J. Straub, Chem. Ing.

After brief references to some of the analytical work of Dutch chemists the author, who is Director of the Food Inspection Laboratory for Amsterdam, gave particulars of some analytical methods which have been devised in this laboratory. An empirical measure of the consistency of butter is made in terms of the force required to cause penetration by a standard "mechanical thumb." Consistency of fats is closely related to the proportion of solid (crystals) to interstitial liquid components, and dilatometric and calorimetric methods for determining this proportion have been devised. In the calorimetric method the rate of temperature changes in the fat during a constant rate of inflow of heat from a surrounding bath across an air jacket is measured and plotted. A new method for measuring and optically characterising the "whiteness" of flours depends on amplification of absorption of different parts of the spectrum on repeated reflection. The paper gave also a general account of food inspection in Amsterdam.

Determining Traces of Zinc

The Determination of Traces of Zinc in Biological Material and Natural Waters. By Noel L. Allport, F.I.C., and C. D. B. Moon, A.I.C.

A method was described which, by reason of its sensitivity, enables traces of zinc to be determined accurately in relatively small samples of biological materials or foodstuffs or in natural waters without preliminary concentration. After destruction of organic matter if necessary, the zinc is quantitatively extracted from aqueous solution by means of a chloroform solution of dithizone in presence of resorcinol. Metals precipitable by hydrogen sulphide in acid solution, if present, are next removed, the precipitation being carried out in presence of acetone to prevent adsorption of zinc. The zinc is afterwards precipitated as quinaldinate, which is either weighed as such on a micro-balance, or dissolved and the zinc estimated colorimetrically by a method depending on the formation of a yellow colouring matter from the quinaldinic component. The only commonly occurring metals or anions that interfere are nickel and cobalt.

The Evaluation of Hydrogen Peroxide. By S. M. L. Tritton, M.P.S., F.I.C.

Hydrogen peroxide, as stabilised for pharmaceutical and surgical use, has been found to vary in its efficacy. Eight stabilised and three unstabilised peroxides were titrated by permanganate, thiosulphate (after liberation of iodine) and titanous chloride. Titrations correlated well for the unstabilised peroxides but the titanous chloride figures were low for all the stabilised peroxides, even when the stabiliser present was sulphuric acid. This may be taken as an indication of the formation of addition compounds between the peroxide and the stabiliser, which are not easily reducible by titanous chloride but which can be oxidised by permanganate. It was found that the titanous chloride titration could be completed with permanganate. A method employing catalase was evolved for estimating ease of decomposition of hydrogen peroxide. If the stabiliser present has catalase-inhibiting properties or produces a pH unfavourable to catalase, the efficacy of the hydrogen peroxide will be seriously impaired.

RECENT TRADE LITERATURE

THE BRITISH ALUMINIUM CO., LTD., have issued an attractive brochure which illustrates the principal forms in which aluminium is used. Aluminium wire bars, alloy ingots, extruded sections, flat bars, sheets, tubes, matting and joints are among the products which form the subject of interesting photographs.

GEORGE KENT, LTD., have issued a folder describing their portable pH potentiometer. A compact unit, it can be transported easily and used for testing in any location. It is self-contained in a metal case which acts as an effective screen for the circuit which incorporates a two-valve Wheatstone bridge network together with an accurate potentiometer. The accuracy is independent of the valve characteristics, and the potentiometer is standardised against a standard Weston cell. All measurements are made with reference to the microammeter. The electrodes consist of a high resistance glass electrode having a platinum internal electrode dipping into a solution of deci-normal hydrochloric acid saturated with quinhydrone, and a saturated calomel electrode with a potassium chloride salt bridge.

W. EDWARDS AND CO. have issued a catalogue which outlines briefly the characteristics of the Kipp and Zonen galvanometers, which are precision instruments of the highest order and possess unique characteristics. In the Moll types the very stable moving system consists of a coil stretched between two wires and extremely careful design, together with workmanship of the highest order, has resulted in an instrument whose high sensitivity may be fully utilised. Special anti-vibration mountings are quite unnecessary. The exceptional zero stability should be borne in mind when considering the sensitivity figures given. The Zernike models have very high volt sensitivity as a light coil is used suspended by a thin quartz fibre. The moving system is perfectly balanced and in this type also the stability is exceptional. Five types of suspension are available with different characteristics but all are interchangeable with one base and magnet.

DAVISON AND PARTNER, LTD., an associate company of the Power-Gas Corporation, Ltd., and of Ashmore, Benson, Pease and Co., Ltd., have issued a new catalogue dealing with their blue and carburetted water gas plants. The types of plant made by the company and its associate companies cover a wide range in capacity and in design. In size they vary from 25,000 cu. ft. up to 8,000,000 cu. ft. per generator per day. The generators may have static or mechanical grates and manual or mechanical fuel feed. The carburetting can be effected by standard combined carburetter and fixing chamber or by individual carburetter and superheater. The operation may be manual, hand-controlled hydraulic, automatic mechanical, automatic hydraulic or automatic hydroelectric mechanical. The catalogue illustrates and describes various types of installations.

A NOTABLE ANNIVERSARY

Arrangements are now being completed for the luncheon which Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, are giving next Friday on the occasion of the 21st anniversary of the five-day week introduced in April, 1918. Lord Lothian will reply to the toast of the guests, proposed by Sir Ernest Benn, who will be in the chair. "Success to the Five-day Week" will be responded to by Mr. Arthur Hacking, O.B.E., the deputy-chairman of Bryant and May, Ltd. His firm also adopted the five-day basis twenty-one years ago, and so Mr. Hacking will be able to speak of its successful working throughout the period which the luncheon will celebrate.

The guests will include the directors of numerous other firms operating the shorter week, besides representatives of all the industries covered by the Benn publications. Those who have already accepted invitations include Lord Hankey, Sir Patrick Hannon, Sir George Lewis, Sir Felix Pole, Sir Campbell Stuart and Mr. Frank Pick.

Personal Notes

MR. FRANKLIN THORP has resigned from the board of United Gas Industries, Ltd.

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MR. A. J. C. HOSKYNs-ABRAHALL and MR. L. HARRIS have been re-elected directors of John Knight, Ltd., soap makers.

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MR. KENNETH WEBSTER, research chemist with I.C.I., Ltd., at Birmingham, was married on Monday at Glasgow, to Miss Olga Durnell.

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MR. E. J. MILLARD, of C. J. Hewlett and Son, Ltd., was elected chairman of the Chemical Trade Section of the London Chamber of Commerce, Inc., at a recent meeting of the Chamber.

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MR. ERIC HOLGATE has become managing director of Titanine, Ltd., makers of paint and related products, in succession to Mr. T. W. H. Ward, who has become chairman of the company.

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MR. REGINALD PALTRIDGE, managing director of Pinchin, Johnson & Co., Ltd., paint manufacturers, is retiring at the end of September next, after having occupied his present position for twenty years.

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MR. FRANCIS D'ARCY COOPER, chairman of Lever Brothers and Unilever, Ltd., who has been gravely ill, has left a London nursing home for his home in Reigate. He has been making satisfactory progress, but a period of convalescence will be necessary before he resumes his business activities.

OBITUARY

MR. JAMES FAICHEN, a director of Annandale & Son, Ltd., paper manufacturers, died at Polton, Scotland, on March 29. He had been connected with the paper-making industry for over fifty years.

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DR. ALEXANDER SCOTT RUSSELL, aged 45, of Cambridge Park, Redlands, Bristol, has died in Belford Hospital, Fort William, from severe injuries received while glissading down a slope on Ben Nevis.

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SIR WILLIAM WATERS BUTLER, a member of the Council of the Federation of British Industries, and formerly a member of the Council of Birmingham University, died on April 7 at the age of 72. He was a past president of the Institute of Brewing, managing director of Mitchells and Butlers, Ltd., brewers, and chairman of the Birmingham Cold Storage, Ltd.

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MR. RICHARD AUGUSTUS CRIPPS, Ph.C., F.I.C., died at Hove recently at the age of 76. He qualified as a chemist and druggist in 1884 and four years later became a Fellow of the Institute of Chemistry. In 1893 he set up in practice as an analyst at Haywards Heath and two years later established a small wholesale business specialising in the manufacture of galenicals and concentrated infusions. His son, Mr. D. H. Cripps, M.P.S., subsequently became a partner in the firm which, in 1935, was made into a limited company. Mr. Cripps was for many years public analyst to the County Borough of Bournemouth, a position to which he was appointed on the formation of the borough in 1901.

MR. ROBERT SCOTT, oil refiner, has left estate valued at £10,440.

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PROFESSOR GEORGE BARGER, F.R.S., Regius Professor of Chemistry in the University of Glasgow, who died on January 6 last, has left personal estate to the total value of £3,222.

MR. C. BELL, chairman of Charles Zimmerman and Co., has left estate of £12,139 (net personalty nil).

* * * *

MR. HENRY FAIRLEY, analytical chemist, who died intestate on October 16 last, has left personal estate in Great Britain valued at £4,947.

* * * *

BARON SELSDON, chairman of Eno Proprieties, Ltd., J. C. Eno, Ltd., and a number of other companies, has left estate of the value of £35,518 (net personalty £17,288).

TO-DAY'S ANNIVERSARY

AUGUST LAURENT, who was a keen critic and became distinguished for his experimental and theoretical studies in organic chemistry, died on April 15, 1853. He spent most of his life in a state of poverty, and was banished from the society of his contemporary scientists in France. Born at La Folie, near Langres, in 1808, Laurent ultimately became a pupil and teaching assistant of Dumas, in Paris. In 1838 he was appointed professor of chemistry at Bordeaux, a post which he abandoned in 1845 to return to Paris to work with Gerhardt. Here circumstances made it necessary for him to accept a poorly-paid post as assayer to the Mint. His "Methode de chimie" was published in 1854, a year after his death. It was in 1832 that Laurent investigated naphthalene and its derivatives and discovered anthracene; four years later, by the oxidation of anthracene he obtained anthraquinone. By the oxidation of naphthalene he produced phthalic acid, and also found that it formed an anhydride by loss of water on heating. Investigating phenol and its derivatives in 1841, he showed that phenol is identical with the product isolated from coal tar by Runge in 1834 and then called "carbolic acid"; at the same time he pointed out that this phenol was different from creosote discovered in wood tar by Reichenbach in 1832.

Foreign Chemical Notes

France

MERCURY ORE DEPOSITS AT RAS-EL-MA in Algeria (department of Constantine) are to be exploited by the newly-founded Société Minière Française de Mercure of 77, rue de Monceau; Paris (capital 510,000 francs).

Belgium

IN CONNECTION WITH THE DESULPHURISATION OF COKE-OVEN AND TOWN GAS a new process of sodium sulphide manufacture has been developed which permits of direct formation of commercial sodium sulphide.

Germany

THE REPORT OF SCHIMMEL AND CO., OF LEIPZIG, for 1938 discloses a decline in exports of essential oils and related products, but an increase in turnover on the home market for which the increased demand for flavouring agents was particularly responsible.

Japan

CHEMOTHERAPEUTIC PRODUCTS of the para-aminobenzene sulphonamide class are to be manufactured by the Japanese Dyestuffs Company (Nippon Senryo Seizo K.K.).

THE AVERAGE YIELD OF DRIED DERRIS ROOT in FORMOSA this year is 1,850 lb. per acre and the estimated output for the current year is 650,000 lb., the whole of which is expected to be consigned to Japan.

FLOTATION AGENTS have been added to the range of products manufactured by the Sumitomo Chemical Industry Company (Sumitomo Kagaku Kogyo K.K.). This concern is expanding its output of methanol, formaldehyde, tar-distillation products and aluminium.

References to Current Literature

Inorganic

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- Chromium oxide catalyst in contact sulphuric acid manufacture. Kiyoura, *J. Soc. Chem. Ind. Japan*, 42, 24-25B.
- Manufacture and properties of oleum. Carter and Edwards, *Chem. and Ind.*, 58, 259-261.
- Composition of commercial mixed fertilisers. Lundstrom and Mehning, *Ind. Eng. Chem.*, 31, 354-361.

Organic

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- Vitamin D and its synthesis. Schmidt, *Osterreichische Chem. Ztg.*, 42, 84-90.
- Heterogeneous catalysis: hydrogenation of benzene. Juliard and Herbo, *Bull. Soc. Chim. Belg.*, 47, 717-769.
- Industrial crystallisation of sugar. Bieselaar, *Bull. Assoc. Chim.*, 56, 3-37, 85-152.
- Manufacture of isoamyl chloride. Ross and Bibbins, *Ind. Eng. Chem.*, 31, 255-256.

Analysis

- Separation of copper and zinc in the analysis of brass. Sarudi, *Z. analyt. Chem.*, 115, 260-265.
- Accuracy of colorimetric analytical methods. Ringbom, *Z. analyt. Chem.*, 115, 332-343, 402-411.
- Determination of sulphur dioxide in presence of sulphuric acid mist and nitric oxide in the chamber process. Lohfert, *Angew. Chem.*, 52, 219-222.
- Reducible sulphur in paper. *Paper Trade J.*, 108, No. 9, 24-25.
- Problems in paint analysis. Druce, *Paint Techn.*, 4, 55-66.
- Determination of sulphur in coal. Simpkin and Jones, *J. Inst. Fuel*, 12, 168-170.
- Volumetric determination of aluminium. Titus and Cannon, *Ind. Eng. Chem. analyt. ed.*, 11, 137-140.

Mineral Oils, Gas, Tar

- Non-catalytic processes of cracking liquid hydrocarbons. Fusteig, *Petroleum Refiner*, 10, No. 5, 112-118.
- Corrosion in oil storage containers. Eisenstecken and Roters, *Oel u. Kohle*, 15, 129-137.
- Asphaltic bitumens in industry. Jackson, *J. Inst. Petroleum*, 25, 51-60.
- Synthesis of paraffin from carbon monoxide and hydrogen on cobalt catalysts. Fischer and Pichler, *Brennstoff Chem.*, 20, 41-48.
- Refining motor benzol. Thau, *Coal Carbonisation*, 5, 37-40.
- Chemical constitution of coal. Gillet, Pirlot and Montfort, *Bull. Soc. Chim. Belg.*, 47, 809-817.
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- Portable gas-producers. Goldman and Jones, *J. Inst. Fuel*, 12, 103-140.

Cellulose, Paper

- Sulphuric acid ester of the constituents of pine wood. Freudenberg and Keller, *Ber.*, 72, 331-334.
- Sulphite cooking process. Ahlm and Brauns, *J. Amer. Chem. Soc.*, 61, 277-280.
- Warm steeping lyes in the ripening of alkali cellulose. *Kunstseide u. Zellwolle*, 21, 42-48.
- Mineral constituents of wood. Bromley and Rudge, *Chem. and Ind.*, 58, 279-280.

Bleaching, Dyeing, Finishing

- Determining the type of a natural dyestuff. Fabrini, *Textiltech.*, 4, 136-142.
- Manufacture and dyeing of lanital. Malard, *Text. Colorist*, 61, 195-198.
- Derivatives of arylamine sulphonc acids in textile processing. Uppal and Venkataraman, *J. Soc. Dyers Colourists*, 55, 125-134.
- Superoxide bleaching of silk goods. Weber, *Melliand Textilber.*, 20, 209-210.

Glass, Ceramics

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- Applications of lithium compounds in the ceramic and glass industries. *Sprechsaal*, 72, 125-126.
- Transformation point of glasses. Jenckel, *Z. Elektrochem.*, 45, 202-214.
- Glass fibres. Anderegg, *Ind. Eng. Chem.*, 31, 290-298.
- Effect of sodium aluminate on refractory clays. Morgan, *J. Amer. Ceram. Soc.*, 22, 88-90.

Metals, Electrometallurgy

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- Deposition of silver alloys. *Metallwaren Ind. u. Galvano-Techn.*, 37, 58-60, 103-104.
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- Corrosion inhibitors and the general theories. Leclerc, *L'Ind. Chim. Belge*, 10, 43-46.
- Corrosion of aluminium and its dependence on purity. Zurbrugg, *Korrosion u. Metallschutz*, 15, 13-15.
- Developments in powder metallurgy. Jones, *Metal Treatment*, 4, No. 16, 145-149, 152.
- Preparation of pure zinc. Truesdale and Edmunds, *Metal Ind.*, 54, 363-365.

Fats, Oils, Waxes

- Hydrogenation of animal and vegetable oils. McCutcheon, *Canadian Chem.*, 23, 53-57.
- Organic base soap. Mugishima, *J. Soc. Chem. Ind. Japan*, 42, 17-18 B.
- Acid catalysts in liquid ammonia: ammonolysis of fatty oils. Balatz, Fellingner and Audrieth, *Ind. Eng. Chem.*, 31, 280-282.

Paints, Pigments

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- Softeners in acrylic resin lacquers. Hintze, *Farben Chem.*, 10, 59-68.
- Driers in relation to synthetics. Bryson, *Fed. Paint Varn. Prod. Clubs Digest*, 1939, 90-98.
- Hydrogenation cracking of Congo copal. Mertens, Helinckx and Hoffmann, *Bull. Soc. Chim. Belg.*, 48, 1-11.

Rubber, Resins, Plastics

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- Applications of polystyrene. Matheson and Goggin, *Ind. Eng. Chem.*, 31, 334-338.
- Concentration of latex. Cotton, *Rubber Age*, 20, 7-11.
- Applications of luminescence in the rubber industry. Dérubéré, *Rev. Générale Caoutchouc*, 16, 2-11.
- Rubber derivatives and synthetic elastic materials. Delorme, *Rev. Générale Matières Plastiques*, 15, 35-39.
- Testing the plastic properties of rennet-casein. Cooper and Hand, *Brit. Plastics*, 10, 572-577.

Miscellaneous

- Preparation of low temperature hydrogenation catalysts. Sully, *Chem. and Ind.*, 58, 282-284.
- Protection of light sensitive drugs by coloured glasses. Eisenbrand, *Glastechn. Ber.*, 17, 11-16.
- New base exchange substances especially of resin basis. Griessbach, *Angew. Chem.*, 52, 215-219.

General News

The Chemical Age Lawn Tennis Tournament. Entries Close April 24.

Only nine days remain for competitors to enter for THE CHEMICAL AGE Lawn Tennis Tournament, details of which were published on March 18. Entries must be sent in by April 24 (first post). The tournament, for which there is no entrance fee, comprises men's singles and doubles, open to members of the chemical industry throughout Great Britain, either as principals or members of staffs. THE CHEMICAL AGE silver challenge cups are held by the winners for twelve months, and statuettes are presented outright to the winners and runners-up.

Immediate application should be made for full particulars and entry forms to The Editor, THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, London, E.C.4. (Telephone: Central 3212).

LORD MCGOWAN, LORD FORTEVIOT AND LORD WEIR, who each guaranteed £1,000, are to be called upon to pay contributions towards the deficit on the Empire Exhibition, Glasgow.

PRESENTATIONS were made to six employees of Thomas Morson and Sons, Ltd., Summerfield chemical works, Ponders End, Middlesex, at a recent ceremony. Five of the men honoured had spent 50 years each with the firm, and the sixth, Mr. A. H. Benison, the works manager, 25 years.

DATED APRIL 1, a list of goods prohibited to be exported except under Board of Trade or Home Office licence is published in the Board of Trade Journal of April 6. The list includes a long schedule of drugs, the import of which is also prohibited except under B.O.T. or Home Office licence. The import of certain dyestuffs is similarly prohibited.

THE LONDON PRICE OF MERCURY increased by 16s. a bottle to £17 18s. 6d. a bottle on Tuesday. This was due to the suspension of shipments from Spain, stocks in this country having now reached a low level. Should Spanish shipments not be resumed for some time, it will probably be possible to obtain further supplies from Italy, which, with Spain, accounts for about 80 per cent. of the world's trade.

AT A MEETING OF THE INSTITUTION OF CHEMICAL ENGINEERS to be held in the rooms of the Geological Society, Burlington House, London, W.1, on Tuesday, April 18, Mr. E. S. Byng (vice-chairman, Standard Telephones & Cables, Ltd.), will present a paper on: "Administrative Training for the Chemical Engineer." All interested in the chemical industry are cordially invited to be present. No tickets will be required.

AT A MEETING held in the House of Commons last week, Mr. E. W. Goodale, chairman of the Silk Association, which is in process of being reconstituted as the Rayon and Silk Association, explained to members of Parliament how, under the Cotton Bill the rayon industry was threatened with control by cotton interests. Mr. Goodale was supported by representatives of the rayon producers. It was decided that amendments should be drafted to give effect to the requirements of the rayon industry.

AT ITS MEETING ON MARCH 29, Mr. E. J. Millard, Ph.C., F.C.S., F.R.M.S., (C. J. Hewlett and Son, Ltd.), was unanimously elected chairman of the Chemical Trade Section of the London Chamber of Commerce, Inc., for the ensuing year. A resolution was adopted recording the great appreciation of the invaluable work performed by the late Mr. David Lloyd Howard in his capacity as chairman of the Section, a position which he had occupied for many years. Mr. H. N. Linstead, secretary of the Pharmaceutical Society of Great Britain, addressed members on "Research and Laboratory Problems of the Pharmaceutical Society's New Headquarters." The meeting also had before it a report issued by the Association of British Chambers of Commerce regarding the export trade of the United Kingdom, and a valuable exchange of views took place. Another question to which reference was made was the recently introduced regulations concerning the importation of goods into New Zealand. In case of difficulty in obtaining permits, members were invited to communicate with the Chamber so that investigations could be made.

From Week to Week

THE PATENT COLLAPSIBLE TUBE CO., LTD., has taken over factory premises at Whitwick Coalville, where they will make silk tubes for packing cosmetics, paints, tooth pastes, etc.

THE ROYAL SOCIETY is preparing for the Ministry of Labour a complete register of scientific research workers whose services could be utilised for the nation in the event of war. Professor A. W. Hill, joint honorary secretary of the Royal Society, is chairman of a sub-committee for scientific research attached to the Central Register Advisory Council of the Ministry of Labour.

THE RESUMED INQUEST ON THE THREE MEN KILLED IN THE EXPLOSION which occurred at the Faversham factory of Heaters, Ltd., explosives manufacturers, on March 25 (see CHEMICAL AGE April 1, 243) was held on Wednesday. Dr. Watts, Home Office Inspector of Explosives, stated that there was no definite evidence of what caused the explosion. The possibility that the accident had been caused by sabotage was ruled out.

THE GOVERNMENT OF INDIA have decided to impose a protective duty of 13 annas only per cwt. on magnesium chloride, and to continue the protection of sugar up to March 31, 1941, at the same rate, less 8 annas per cwt. The Government consider that since the report of the Indian Tariff Board was submitted on the subject, the situation had changed fundamentally. A further inquiry will be carried out after the expiry of the period now fixed. The modest reduction made is supported by the comparatively high prices for Java sugar.

UNDER THE AUSPICES of the Food Group (Nutrition Panel) of the Society of Chemical Industry a whole-day conference will be held on the subject of Vitamin E at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London, W.C.1, on Saturday, April 22. The conference will be opened by Mr. W. A. S. Calder, chairman of the Council of the Society, and there will be three sessions dealing, respectively, with the chemistry of vitamin E, the physiological action of the vitamin, and the chemical and veterinary uses of wheat germ oil and vitamin E preparations.

THE TREASURY, on the recommendation of the Import Duties Advisory Committee, have issued the Additional Import Duties (No. 2) Order, 1939 (S.R. and O. 1939, No. 403) which, as from April 14, 1939, increases the rate of duty on potassium ferrocyanide from 10 per cent. *ad valorem* to 2d. per lb. The Committee state that import prices have fallen greatly, and arrangements with certain foreign producers, aimed at avoiding unrestricted competition, have failed owing to heavy imports from other sources. A declaration has been made by the British makers as to the future price of potassium ferrocyanide which the Committee regard as reasonable and which will ensure that the price will be maintained on a lower basis than was the case up to 1936.

AT A MEETING of the Council of the Pharmaceutical Society held on Wednesday, the treasurer, Mr. E. T. Neathercoat, presented the annual statement for 1938. It showed an income of £115,567 (against £123,327 in 1937) and an expenditure of £102,548 (against £107,698 in 1937). It was stated that the additional work thrown on the Society by the Pharmacy and Poisons Act, which made membership compulsory and caused it to rise immediately from 16,000 to 24,000 pharmacists, revealed the inadequacy of the present headquarters to cope with the greatly increased work. Consequently new premises were being erected on a freehold site on the north side of Brunswick Square which would be ready for occupation in the summer of next year.

JOSEPH CROSFIELD AND SONS, LTD., soap manufacturers of Warrington, have what is believed to be the most completely equipped A.R.P. first-aid and cleansing stations in the North of England. A large area of glass roofing has been removed and replaced by steel, thus protecting workers from flying glass dangers. Inside the station which is protected by an anti-gas curtain and an air-lock chamber, are rows of baths, showers and fully-equipped first-aid rooms. The equipment includes 5,000 candle-power auxiliary floodlighting for use in the case of failure of the main electricity supply, localised examination lights operated from trolleys, and stretchers which are protected by anti-gas material. Thomas Morson and Sons, Ltd., recently received congratulations from a prominent Home Office official on their excellent system of shelter protection.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PROTECTION OF METAL AGAINST CORROSION.—Submarine Cables, Ltd., British Non-Ferrous Metals Research Association, J. N. Dean, H. F. Wilson, E. A. G. Liddiard, and T. H. Rogers. 8468.
MANUFACTURE OF EMULSIONS.—Standard Oil Development Co. (United States, May 20, '38.) 8422.

PREPARATION OF NITROGEN-CONTAINING COMPOUNDS.—W. J. Tennant (Armour and Co.). 8988.

DISTILLATION OF CRUDE OIL, ETC., obtained from fossil coal, etc. R. Adler. 9501.

ADSORPTION AND PURIFYING AGENT, ETC.—R. Adler. 9502.

CYANIDE TREATMENT OF PRECIOUS METAL ORES.—A. Afron. 9609.
CONTINUOUS REFINING OF GLYCERIDE OILS, ETC.—Aktiebolaget Separator. (Germany, March 29, '38.) 9515.

PROCESS FOR REMOVAL OF CARBON MONOXIDE FROM MIXTURES THEREOF WITH HYDROGEN.—American Magnesium Metals Corporation. (Germany, May 7, '38.) 9206.

PREPARATION OF ARALKYL KETONES, ETC.—Armour and Co. (United States, April 11, '38.) 9292.

METHODS, ETC., OF PRODUCTION OF IRON, ETC.—Association des Ouvriers en Instruments de Precision. (Luxembourg, April 15, '38.) 9438; (Luxembourg, May 30, '38.) 9439.

ELECTROLYTIC POLISHING OF METALS.—E. B. Bergsman, P. A. E. T. Eriksson, G. S. Frey, and G. E. H. Hildebrand. (Sweden, March 30, '38.) 9592; (Sweden, April 11, '38.) 9593.

HEAT TREATMENT OF METALS.—G. H. Bull. 9388.

PREPARATION OF A COMPOUND OF 3:4-DIOXYPHENYLETHANOL METHYLAMINE STABLE TO OXIDATION.—Byk-Guldenwerke Chemische Fabrik, A.-G. (Germany, April 25, '38.) 9327.

Absorption of Gases by Liquids.—Chemical Construction Corporation. (United States, March 30, '38.) 9751.

MANUFACTURE OF CONDENSATION PRODUCTS.—Deutsche Hydrierwerke, A.-G. (Germany, March 25, '38.) 9585.

MANUFACTURE OF IMPREGNATED PAPER.—Distillers Co., Ltd., and H. P. Standinger. 9854.

SEPARATION OF MINERALS.—E. I. du Pont de Nemours and Co., (United States, April 5, '38.) 9233.

ANNEALING METAL ALLOYS.—Electric Resistance Furnace Co., Ltd., and H. Knight. 9286.

PROCESS FOR MAKING ACETYLATED THREADS.—Felten and Guilleaume Carlsberg, A.-G. (Germany, May 11, '38.) 9407.

PRODUCTION OF HIGH VELOCITY IONS.—Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten. (Germany, March 26, '38.) 9429.

MANUFACTURE OF HYDROCARBON OILS.—J. G. Fife (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 9559.

METHOD OF RECOVERING KRYPTON AND XENON FROM AIR.—Ges. für Lindes Eismaschinen, A.-G. (Germany, April 9, '38.) 9571.

PREPARATION OF POLYMERISATES OF FORMALDEHYDE.—Guthehoffnungshütte Oberhausen, A.-G. (Germany, March 26, '38.) 9535.

PREPARATION OF PRODUCTS EFFERVESCING WITH WATER.—Henkel and Cie, Ges. (Germany, May 18, '38.) 9822.

PRODUCTION OF BERYLLIUM ALLOYS.—Heraeus-Vacuumschmelze, A.-G. (Germany, March 25, '38.) 9318.

PRODUCTION OF CELLULOSES BY DIGESTION WITH CALCIUM HYDROXIDE, ETC. (Germany, June 4, '38.) 9205.

TREATMENT OF DYEINGS PREPARED ON CELLULOSE MATERIALS BY MEANS OF SUBSTANTIVE DYE STUFFS.—I. G. Farbenindustrie. (Germany, March 24, '38.) 9216.

MANUFACTURE, ETC., OF ACID LEUCO-SULPHURIC ACID ESTERS, ETC. I. G. Farbenindustrie. (Germany, March 24, '38.) 9346.

MANUFACTURE OF CONVERSION PRODUCTS, ETC.—I. G. Farbenindustrie. (Germany, March 26, '38.) 9420.

MANUFACTURE OF 4-AMINO BENZENE-SULPHONAMIDE.—I. G. Farbenindustrie. (Germany, March 25, '38.) 9421.

THICKENING AGENTS.—I. G. Farbenindustrie. (Germany, Oct. 1, '38.) 9528.

METHOD OF SEPARATING GAS MIXTURES BY THERMAL DIFFUSION.—I. G. Farbenindustrie. (Germany, April 4, '38.) 9529.

MANUFACTURE OF BASIC DYE STUFFS OF TRIARYLMETHANE SERIES.—I. G. Farbenindustrie. (Germany, March 28, '38.) 9700.

MANUFACTURE OF AZO-DYE STUFFS.—I. G. Farbenindustrie. (Germany, March 30, '38.) 9847.

PRODUCTION OF SINTER PHOSPHATES.—Kali-Chemie, A.-G. (Germany, May 5, '38.) 9536.

PRODUCTION OF SULPHONATED FATTY MATERIALS.—B. E. D. Kilburn (National Oil Products Co.). 9359.

MANUFACTURE OF STEEL.—Kohle-und Eisenforschung Ges. (Germany, June 10, '38.) 9204.

PROCESS FOR THE EXTRACTION OF AIR FROM CERAMIC PASTES.—H. Koppers' Industriele Maatschappij N.V. (Germany, March 30, '38.) 9702.

SEPARATION OF ORGANIC COMPOUNDS.—Laboratoires Francais de Chimiotherapie, G. Sandulesco, and A. Girard. (France, March 28, '38.) 9716.

FLUORESCENT MATERIALS.—L. A. Levy, and D. W. West. 9370.

PROTECTION OF OBJECTS OF MAGNESIUM, ETC., AGAINST CORROSION. Langbein-Pfannhauser-Werke, A.-G. (Germany, April 9, '38.) 9587.

PROCESS FOR THE MAKING COMPACT, AND DYEING, OF OXIDIC PROTECTIVE LAYERS ON MAGNESIUM, ETC.—Langbein-Pfannhauser-Werke, A.-G. (Germany, April 9, '38.) 9588.

PRODUCTION OF NITROPARAFFINS.—N. Levy, and Imperial Chemical Industries, Ltd. 9712.

PROCESS, ETC., FOR COLOURING EXTRUDED CERAMIC ARTICLES.—H. Lingl. (Germany, June 24, '38.) 9696.

RUBBER COMPOSITIONS.—Liverpool Electric Cable Co., Ltd., and L. T. Reynolds. 9310, 9312.

PRODUCTION OF ORGANIC THIOCYANO COMPOUNDS.—Manchester Oxide Co., Ltd., J. H. Clayton, and B. Bann. (Aug. 5, '38.) 9789.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works. (United States, March 24, '38.) 9250, 9251.

METHOD OF STABILISING ALKALI METAL ALCOHOLATES, ETC.—Mathieson Alkali Works. (United States, March 26, '38.) 9302.

PRESERVATION OF ORGANIC MATERIALS.—Musher Foundation, Inc. (March 31, '38.) (United States, April 5, '37.) 9566.

PROCESS FOR THE EXTRACTION OF MIXTURES OF ISOMERIC ORGANIC COMPOUNDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Netherlands, March 30, '38.) 9711.

PRODUCTION OF SULPHONATED FATTY MATERIALS.—National Oil Products Co. (United States, March 24, '38.) 9212.

PROCESSES FOR THE POLYMERISATION OF OLEFINS.—G. Natta, and M. Baccaredda. (Italy, March 26, '38.) 9431.

METALLIFEROUS SUBSTANTIVE DYE STUFFS.—H. E. Potts (Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann). 9591.

TREATMENT OF WASTE WATER IN THE MANUFACTURE OF PAPER.—A. Reiss, and A. Kahn. 9569.

PROCESSES FOR CONTINUOUS FRACTIONAL DISTILLATION.—Rheinmetall-Borsig, A.-G. (Germany, June 11, '38.) 9801.

PRODUCTION OF THERAPEUTICALLY VALUABLE SYMMETRIC DIARYL DIALKYL-ETHYLENE COMPOUNDS SUBSTITUTED IN THE AROMATIC RING BY HYDROXYL GROUPS.—R. T. Richter Gedeon Vegyeszeti Gyár. (Hungary, March 30, '38.) 9856.

MANUFACTURE OF FURANE DERIVATIVES OF THE PYRAZOLONE SERIES. Schering, A.-G. (Germany, May 10, '38.) 9448.

Complete Specifications Open to Public Inspection

CHROMIUM METALLURGY and the manufacture of chromium steel. M. J. Udy. Sept. 24, 1937. 31533/37.

MAKING ALLOYS CONTAINING IRON, CHROMIUM, SILICON, AND CARBON. M. J. Udy. Sept. 27, 1937. 31534/37.

VULCANISATION OF RUBBER.—Wingfoot Corporation. Sept. 23, 1937. 17003/38; Sept. 24, 1937. 18025/38.

PRODUCING SYNTHESIS GAS BY GASIFICATION OF FUELS UNDER ELEVATED PRESSURE.—Metallges. A.-G. Sept. 27, 1937. 22260/38.

TREATMENT OF SPENT COBALT CATALYSTS.—Ruhrchemie, A.-G. Sept. 25, 1937. 26275/38.

PRODUCTION OF CATALYSTS.—Ruhrchemie, A.-G. Sept. 27, 1937. 26276/38.

MAGNESIUM ALLOYS.—G. Von. Giesche's Erben. Sept. 21, 1937. 26702/38.

MAKING ALLOYS CONTAINING IRON, CHROMIUM, SILICON AND CARBON. M. J. Udy. Sept. 27, 1937. 26736/38.

MAGNESIUM ALLOYS.—G. Von. Giesche's Erben. Sept. 21, 1937. 26822-3/38.

CHROMIUM ALLOYS AND OTHER CHROMIUM COMPOUNDS.—M. J. Udy. Sept. 23, 1937. 26984/38.

MANUFACTURE OF ABRASIVE ALUMINA.—Chemical Construction Corporation. Sept. 22, 1937. 27122/38.

CRACKING OR COKING HYDROCARBON OILS.—Naamlooze Vennootschap Nieuwe Octrooi Maatschappij. Sept. 21, 1937. 27163/38.

DRYING OF SOLID MATERIALS.—British Celanese, Ltd. Sept. 23, 1937. 27256/38.

INFLUENCING ELECTRO-CHEMICAL REACTIONS IN AQUEOUS SOLUTIONS OR SALT MELTS.—H. Hausner. Sept. 21, 1937. 27301/38.

CONTINUOUS PRODUCTION OF HIGHLY CONCENTRATED NITRIC ACID. Mamag-Meguini, A.-G. Sept. 21, 1937. 27414/38.

MANUFACTURE AND PRODUCTION OF N-SUBSTITUTED DERIVATIVES OF AROMATIC AMINES.—I. G. Farbenindustrie. Sept. 25, 1937. 27544/38.

MANUFACTURE OF MALTOSAMINES.—E. I. du Pont de Nemours and Co. Sept. 21, 1937. 27577/38.

RESINOUS MATERIALS.—British Thomson-Houston Co., Ltd. Sept. 24, 1937. 27657/38.

METHOD FOR THE MANUFACTURE OF HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN.—Koppers' Industriele Maatschappij Naamlooze Vennootschap, H. Sept. 23, 1937. 27807/38.

MANUFACTURE OF ESTERS OF 2-OXYBUTADIENE-1:3.—Dr. A. Wacker Ges. Fur Elektrochemische Industrie Ges. Sept. 25, 1937. 27906/38.

PROCESS FOR THE MANUFACTURE OF LIGHT and porous materials from substances containing cellulose and cement or mortar.—R. Handl, and W. F. Wagner. Sept. 25, 1937. 28000/38.

PROCESS FOR THE MANUFACTURE OF SUBSTANTIVE GREEN POLYAZO-DYESTUFFS.—I. G. Farbenindustrie. Sept. 27, 1937. 28040/38.

MANUFACTURE OF SINTERED CALCIUM OXIDE.—A.-G. Fur Sticks-toffdunger. Sept. 27, 1937. 28095/38.

PRESERVATION OF ORGANIC MATERIALS such as oils.—Musher Foundation, Inc. April 5, 1937. 9566/39.

Specifications Accepted with Date of Application

PROCESS FOR THE MANUFACTURE OF THERAPEUTICALLY VALUABLE COMPOUNDS.—Schering-Kahlbaum, A.-G. June 15, 1936. (Samples furnished.) 502,558.

MANUFACTURE OF ACETALDEHYDE.—E. Neumann, and E. J. Lush. July 23, 1937. 502,725.

MANUFACTURE OF COMPOUNDS containing active methylene groups.—W. W. Groves (I. G. Farbenindustrie.) Aug. 19, 1937. 502,665.

MANUFACTURE OF OXO-COMPOUNDS of the cyclopentano-polyhydrophenanthrene series.—W. W. Groves (I. G. Farbenindustrie.) Aug. 21, 1937. (Samples furnished.) 502,666.

MANUFACTURE OF MILK soluble alginate compounds.—R. Haddan (Kelco Co.). Sept. 17, 1937. 502,609.

MANUFACTURE AND PRODUCTION OF POLYMERISATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 20, 1937. (Samples furnished.) 502,730.

MANUFACTURE OF COMPOSITIONS from nitrocellulose and polyvinyl acetals.—W. W. Groves (Deutsche Celluloid-Fabrik). Sept. 20, 1937. 502,670.

HYDROGENATION AND CRACKING OF OILS.—E. A. Ocon. Sept. 20, 1937. 502,798.

PRODUCTION OF MOTOR FUEL by vapourising and cracking hydrocarbon materials.—E. A. Ocon. Sept. 20, 1937. 502,799.

MANUFACTURE OF A CYCLIC HYDROCARBON.—I. G. Farbenindustrie. Sept. 24, 1936. 502,675.

MANUFACTURE OF A DITERPENE.—I. G. Farbenindustrie. Sept. 24, 1936. 502,676.

MANUFACTURE AND PRODUCTION OF ALLYL CHLORIDE.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 21, 1937. 502,611.

MANUFACTURE AND PRODUCTION OF DISAZO DYESTUFFS containing chromium.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 21, 1937. 502,677.

ISOLATION OF BORON FLUORIDE.—E. I. du Pont de Nemours and Co. Oct. 10, 1936. 502,680.

PREPARATION OF AMINO HYDROXY DERIVATIVES OF DIARYLMETHANES.—W. Blythe and Co., Ltd., W. H. Bentley, and B. Catlow. Sept. 22, 1937. 502,860.

PRODUCING FAST DYEINGS or printings on artificial structures made from organic highly polymeric bodies.—I. G. Farbenindustrie. Sept. 30, 1936. 502,861.

MANUFACTURE OF UNSATURATED ALCOHOLS.—E. I. du Pont de Nemours and Co., and A. D. Macallum. Sept. 22, 1937. 502,693.

MANUFACTURE OF CARBON TETRACHLORIDE.—I. G. Farbenindustrie. Nov. 19, 1936. 502,735.

PRODUCTION OF ALIPHATIC AMINES.—H. F. Oxley, and E. B. Thomas. Sept. 23, 1937. 502,737.

PRODUCTION OF AMINES.—H. F. Oxley, and E. B. Thomas. Sept. 23, 1937. 502,739.

PROCESS FOR THE MANUFACTURE OF POLYMERIC CARBOXYLIC ACIDS and their derivatives.—A. Carpmal (I. G. Farbenindustrie.) Sept. 23, 1937. 502,742.

TREATMENT OF COAL and like tar oils.—Steinkohlen-Bergwerk Rheinpreussen. Sept. 24, 1936. 502,802.

MANUFACTURE OF METHYL VINYL KETONE.—I. G. Farbenindustrie. Sept. 26, 1936. 502,813.

PREPARATION OF PIGMENTS of the phthalocyanine series.—Montecatini Soc. Generale Per l'Industria Mineraria ed Agricola. July 3, 1937. 502,623.

PRODUCTION OF FAST DYEINGS.—G. W. Johnson (I. G. Farbenindustrie.) Oct. 5, 1937. 502,697.

SWEETENING HYDROCARBON FLUIDS.—A. H. Stevens (Phillips Petroleum Co.). Oct. 23, 1937. (Convention date not granted.) 502,752.

GAS EXPANDED RUBBER SUBSTITUTES and methods of producing the same.—Expanded Rubber Co., Ltd. July 9, 1937. 502,759.

RECOVERY OF CELLULOSE ETHER.—Dow Chemical Co. Feb. 5, 1937. 502,840.

PROCESS FOR THE MANUFACTURE OF RESIN-LIKE SYNTHETIC MATERIALS.—Deutsche Hydrierwerke, A.-G. March 17, 1937. 502,720.

PRODUCTION OF POLYAZO-DYESTUFFS.—Chemical Works, formerly Sandoz. March 13, 1937. 502,767.

PRODUCING HYDROCARBONS by the catalytic conversion of carbon monoxide with hydrogen.—Ruhchemie, A.-G. April 17, 1937. 502,771.

SEPARATION OF PHENOL and oxydiphenyls.—Chemische Fabrik von Heyden, A.-G. June 18, 1937. 502,843.

PRODUCTION OF OXIDES of tin and antimony.—V. Himmelbauer. May 6, 1938. 502,846.

MANUFACTURE OF WATER-SOLUBLE CONDENSATION PRODUCTS from aromatic aldehyde sulphonic acids.—J. R. Geigy, A.-G. May 24, 1937. 502,848.

PREPARATION OF AQUEOUS SOLUTIONS of *p*-aminobenzenesulphonamide particularly for injection purposes.—Chemisch-Pharmazeutische, A.-G. Bad Homburg. Nov. 30, 1937. 502,786.

Chemical and Allied Stocks and Shares

IN the absence of reduced tension in European political affairs, share values in the industrial and other sections of the Stock Exchange were marked down sharply on Tuesday, but no heavy selling developed, and at the time of writing markets have a somewhat steadier appearance.

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In accordance with the general trend, securities of companies associated with the chemical and allied trades have moved against holders and are lower on balance, although in some cases there was a small recovery from the prices touched earlier in the week. Imperial Chemical have declined from 30s. to 28s., but this is partly explained by the fact that the price is now "ex" the final dividend. British Oxygen, which are 70s., compared with 73s. 9d., are now also "ex" the final dividend. British Aluminium were a relatively steady feature and are 54s. at the time of writing, compared with 54s. 6d. a week ago. Birmid Industries were also fairly well maintained in price, sentiment being influenced by the increasing demand for aluminium and other metals and alloys required by the aircraft industry.

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Lever & Unilever declined sharply, partly owing to selling from the Continent, and are 33s., compared with 35s. 4½d. a week ago, the market having remained uncertain whether the impending dividend will be maintained. United Molasses moved down from 23s. 6d. to 21s. 4½d., although the general assumption is that the forthcoming interim payment is likely to be unchanged. Distillers show a reaction from 91s. to 88s. 9d. at the time of writing. In this case the market view is that whether the distribution will be kept on a 22½ per cent. basis is likely to turn mainly on the provisions of the Budget.

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Babcock and Wilcox were lower at 40s. awaiting the impending dividend announcement. United Steel were lower at 22s. 9d., and moderate declines were also shown by most iron, steel and allied shares, although Colvilles and South Durham Steel were relatively steady as it is assumed these two companies are likely to benefit from better demand for shipbuilding steels. Dorman Long

fluctuated, but on balance for the week show an improvement from 27s. 3d. to 28s. Tube Investments were lower and Stewarts and Lloyds moved down on the preliminary results. The latter show that although the dividend is again limited to 12½ per cent., it is a conservative payment and permits a large sum to be placed to reserves.

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Associated Cement are 68s. 1½d. at the time of writing, compared with 69s. 4½d. a week ago, and most other cement shares showed only moderate declines. Rugby Portland Cement shares were steadier on satisfaction with the results. British Plaster Board at 26s. 9d. are within 6d. of the price current a week ago. Imperial Smelting at 9s. 9d. are unchanged on balance and Borax Consolidated are 22s., compared with 22s. 9d. Pinchin Johnson made the slightly lower price of 23s. 3d., while Goodlass Wall at 9s. 4½d. were little changed, awaiting the preliminary results for the past year's working. Cellon ordinary shares at 16s. 3d. were little changed, allowing for the deduction of the dividend from the price.

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Courtaulds moved down from 25s. 3d. to 23s. 9d., but other textile shares showed only moderate declines, although in most cases they were inactive. British Celanese issues were somewhat steadier, awaiting the forthcoming decision as to the first preference dividend.

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Boots Drug moved down from 41s. 3d. to 40s. 6d., Sangers from 20s. 7½d. to 20s. 4½d., and Beechams Pills deferred shares from 6s. 7½d. to 6s. 4½d. Results of the latter company fall to be issued next month. Timothy Whites at 23s. 10½d. are virtually the same as a week ago.

"Shell" and other leading oil shares have reacted sharply in price, as have most securities with an international market, although selling pressure was not particularly heavy. The lower prices are attributed entirely to the surrounding conditions on the Stock Exchange, which is usually reflected very closely by shares with a large following.

Weekly Prices of British Chemical Products

A STEADY trade is being enjoyed by most sections of the general chemical market this week and more activity is in evidence than is usually expected immediately after the Easter holiday period. At the consuming end buyers are calling up their contract commitments with a fair degree of promptness and deliveries cover substantial quantities. So far as values are concerned there are no important price changes to record for general chemicals, rubber chemicals and wood distillation products and quotations for nearly all items are on a firm basis. There are indications of a steady improvement in the home trade for coal tar products. Quite a good volume of buying orders for small parcels is in evidence and quotations are inclined to be firmer. Toluol and xylol are both enjoying a good trade and values are slightly dearer.

MANCHESTER.—At the moment of writing the Manchester market

for chemical products continues under holiday influences to some extent, and sellers locally report few fresh transactions of any consequence. On the whole, contract deliveries have been resumed fairly well after the interruption and the quantities being absorbed are not unsatisfactory so far as the leading heavy materials are concerned. The price position as a whole continues reasonably steady. In the case of the by-products the light distillates and one or two other classes meet with a quietly steady demand, but trading conditions in most other instances are slow and a certain amount of prices easiness is again reported.

GLASGOW.—There has been an improved demand for general chemicals both for home trade and export since our last report. Prices generally continue very firm at about previous figures, but there are no quotable changes to report.

Price Changes

Rises: Toluol, 90%; pure; Xylol, commercial and pure; Mercury products.
Falls: Arsenic, white powdered Cornish (Manchester); Copper Sulphate (Manchester).

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.
 ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.
 ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.
 ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.
 AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.
 AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.
 AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks
 AMMONIUM CHLORIDE.—Grey, £17 10s. per ton, d/d U.K. Fine white, 98%, £16 per ton, d/d U.K.
 AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammuniac.)
 AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.
 ANTIMONY OXIDE.—£68 per ton.
 ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r. mines, according to quantity. MANCHESTER: White powdered Cornish, £15 10s. per ton, ex store.
 BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.
 BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. SCOTLAND: £9 5s. per ton net ex store.
 BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.
 BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.
 CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.
 CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.
 CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4½d. per lb. d/d station in single 70-lb. cylinders.
 CHROMETAN.—Crystals, 2½d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.
 CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.
 CHROMIC OXIDE.—11½d. per lb.; d/d U.K.
 CITRIC ACID.—1s. 0½d. per lb. MANCHESTER: 1s. 0½d. SCOTLAND: B.P. crystals, 1s. 0½d. per lb.; less 5%, ex store.
 COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 15s. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.
 CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.
 FORMALDEHYDE.—£20-£22 per ton.
 FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.
 GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2½% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY PRODUCTS.—Ammoniated B.P. (white precip.), lump, 6s. 8d. per lb.; powder B.P., 6s. 10d.; bichloride B.P. (corros. sub.), 5s. 11d.; powder B.P., 5s. 7d.; chloride B.P. (calomel), 6s. 8d.; red oxide cryst. (red precip.), 7s. 9d.; levig, 7s.; yellow oxide B.P., 7s. 1d.; persulphate white B.P.C., 6s. 10d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 9d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.
 METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5½d. per lb. carriage paid. SCOTLAND: 5½d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. to 10½d. per lb. SCOTLAND: B.P. Crystals, 10½d. MANCHESTER: B.P. 9½d. to 11½d.

POTASSIUM PRUSSIAN.—5½d. to 6d. per lb. SCOTLAND: 6½d. net, in casks, ex store. MANCHESTER: Yellow, 6d. to 6½d.

PRUSSIAN OF POTASH CRYSTALS.—In casks, 6½d. per lb. net, ex store.

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d'd address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 10s. per ton d/d station. **SCOTLAND:** Powdered 98/99%, £10 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. **GLASGOW:** £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. **GLASGOW:** £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. **MANCHESTER:** £10 15s.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. **GLASGOW:** £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. **MANCHESTER:** Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. **GLASGOW:** £1 12s. 0d. per cwt. in 1-cwt kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

SODIUM PRUSSIAN.—4d. per lb. for ton lots. **GLASGOW:** 4d. **MANCHESTER:** 4½d. to 5d.

SODIUM SILICATE.—£8 2s. 6d. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. **SCOTLAND:** Ground quality, £3 5s. per ton d/d. **MANCHESTER:** £3 10s.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. **MANCHESTER:** Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. **MANCHESTER:** 1s. 1½d. per lb. **GLASGOW:** 1s. 1½d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIO SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 0d. to 3s. 3d. per lb.

CARBON BLACK.—3½d. to 4 1/16d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11½d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3½d. to 4½d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

SULPHUR.—£9 to £9 5s. per ton. **SULPHUR PRECIP. B.P.,** £55 to £60 per ton. **SULPHUR PRECIP. COMM.,** £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939: November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939: November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1939.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1939.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. **GLASGOW:** Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. **MANCHESTER:** Pure, 1s. 8d. to 1s. 8½d. per gal.; crude 11d. to 11½d. per gal.

CARBOLIC ACID.—Crystals, 6½d. to 7½d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

CREOSOTE.—Home trade, 3½d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6½d. per gal., according to grade. **MANCHESTER:** 3d. to 3½d. **GLASGOW:** B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5½d. to 6½d.

CRESYLIC ACID.—97/99%, 1s. 4d. to 1s. 7d.; 99/100%, 1s. 9d. to 2s. 6d. per gal., according to specifications; Pale, 99/100%, 1s. 6d. to 1s. 8d.; Dark, 95%, 1s. 2d. to 1s. 4d. per gal. **GLASGOW:** Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. **MANCHESTER:** Pale, 99/100%, 1s. 9d. to 1s. 10d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. **MANCHESTER:** 90/160%, 1s. 5d. to 1s. 7d. per gal. **GLASGOW:** Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £9 10s. per ton in 2-cwt. bags. **LONDON:** Fire lighter quality, £3 to £4 10s. per ton. **GLASGOW:** Fire lighter, crude, £6 to £7 per ton (bags free). **MANCHESTER:** Refined, £10 10s. to £11 10s. per ton f.o.b.

PITCH.—Medium, soft, 27s. 6d. per ton, f.o.b. **MANCHESTER:** 25s. f.o.b., East Coast. **GLASGOW:** f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. 6d. to 14s. per gal.; 90/160%, 10s. 6d. to 11s. 6d. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. **GLASGOW:** 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. **MANCHESTER:** 11s. to 14s. per gallon.

TOLUOL.—90%, 2s. to 2s. 1d. per gal.; pure 2s. 4d. to 2s. 5d. **GLASGOW:** 90% 120, 1s. 10d. to 2s. 1d. per gal. **MANCHESTER:** Pure, 2s. 4d. per gallon, naked.

XVLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. **GLASGOW:** Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. **MANCHESTER:** Brown, £8; grey, £9 10s.

METHYL ACETONE.—40.50%, £32 to £35 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 5d. per gal.

WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/1° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34.5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLOROBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d. per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8½d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

STEWARTS AND LLOYDS, LTD. (incorporated in Scotland). (M., 15/4/39.) March 21, charge by way of collateral security supplemental to Trust Deeds dated January 30, 1934, etc.; charged on various properties.

County Court Judgments

FORRESTER, Mr. E. C., 68 Spencer Street, Birmingham. (C.C., 15/4/39.) Manufacturer of plastic compositions. £14 3s. 5d. January 13.

SPENCER HAYES AND CO., LTD., R/O, 56 William Edward Street, Birmingham. (C.C., 15/4/39.) Manufacturing chemists. £22 6s. 3d. January 31.

BROOKES (DUDLEY), LTD., R/O, 28 Wolverhampton Street, Dudley. (C.C., 15/4/39.) Manufacturing chemists. £10 15s. 10d. February 28.

Winding-up Petition

BRITISH GLYCERINE MANUFACTURERS, LTD. (W.U.P., 15/4/39.) March 23, by Hubert K. Sachsels, 243 Cromwell Road, S.W. Hearing, Royal Courts of Justice, Strand, April 24.

Companies Winding-up Voluntarily

CHEMICAL AND METALLURGICAL CORPORATION, LTD. (C.W.U.V., 15/4/39.) By Special Resolution, March 31, W. J. Maltman, Gaskell-Marsh Works, Widnes, appointed liquidator.

CWMBRAN CHEMICAL CO., LTD. (C.W.U.V., 15/4/39.) By special resolution, March 31, F. Longford, St. Rollox Works, Glasgow, appointed liquidator.

Company News

William Briggs and Sons, Ltd., have declared an interim dividend of 5 per cent. (same) on ordinary shares.

Bryant and May, Ltd., have declared a final dividend of 15 per cent., tax free, on the ordinary shares, making 25 per cent. for the year.

Doulton and Co., Ltd., report for the year ended December 31 a net profit of £90,765 (£123,023). The carry forward is £82,672 (£61,907).

Horace Cory & Co., Ltd., chemical colour manufacturers, report net trading profits for 1938 of £4,780 (£4,540). A dividend of 10 per cent., less tax (same) has been declared.

Meta-Titanium Laboratories, Ltd., manufacturing chemists, etc., have increased their nominal capital by the addition of £5,250, beyond the registered capital of £1,050.

English Clays Lovering Pochin and Co., Ltd., have declared a dividend of 5½ per cent. on cumulative first preference shares in respect of half-year to March 31, and on 7 per cent. second preference shares for the same period, both payable May 1.

William Blythe and Co., Ltd., report a net profit for 1938 of £36,683 (£35,807); reserved for taxation, £5,744 (£4,678); transfer to depreciation reserve, £1,769 (nil); final dividend on ordinary shares of 7 per cent., making 10 per cent. (same); transfer to general reserve, £9,000 (the same); forward, £1,655 (£2,543).

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—His Majesty's Trade Commissioner at Johannesburg reports that the Johannesburg City Council is calling for tenders (Contract No. 246) for the supply and delivery as and when required during the year commencing July 1, 1939, of 500 tons of bituminous emulsion. Tenders endorsed "Contract No. 246—Bituminous Emulsion," should be addressed to the Town Clerk, Municipal Offices, Johannesburg, by whom they will be received up to noon on May 17, 1939. (T.21026/39.)

Greece.—A firm in Salonica wishes to obtain representation, on a commission basis, of United Kingdom manufacturers of chemical and pharmaceutical products; metals in general drugs. (Ref. No. 280.)

Forthcoming Events

London.

April 18.—Institution of Chemical Engineers. Burlington House, Piccadilly, W.1. 6 p.m. E. S. Byng, "Administrative Training for the Chemical Engineer."

April 19.—Electrodepositors' Technical Society. Northampton Polytechnic Institute, St. John Street, E.C.1. 8 p.m. Symposium on "Bright Nickel Plating."

April 20.—The Chemical Society. Burlington House, Piccadilly, W.1. 8 p.m. Meeting for the reading of original papers.

April 20-21.—Chemical Engineering Group. Royal School of Mines, Prince Consort Road, South Kensington. 2.30 p.m. Conference on Safety in Chemical Works.

April 21.—Royal Institution. 21 Albemarle Street, W.1. 9 p.m. A. E. Dunstan, "The Utilisation of Petroleum Gases."

April 22.—Society of Chemical Industry, Food Group. London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. 10.30 a.m., 2.15 p.m. and 5 p.m. "Vitamin E."

April 25.—British Chemical and Dyestuff Traders' Association, Ltd. Annual general meeting. Savoy Hotel, W.C.2. 3 p.m.

Birmingham.

April 21.—Institute of the Plastics Industry. James Watt Memorial Institute, Great Charles Street. 8 p.m. Annual section meeting.

Society of Chemical Industry. Chamber of Commerce Buildings, New Street. 7.30 p.m. Dr. H. M. Stanley, "The Polymerisation of Unsaturated Hydrocarbons."

Manchester.

April 17.—Institution of the Rubber Industry. Engineers' Club, Albert Square. 7.30 p.m. Annual general meeting.

April 21.—Society of Dyers and Colourists. 36 George Street. 7 p.m. Annual meeting.

Sheffield.

April 19.—Society of Glass Technology. Annual general meeting. "Elmfield," Northumberland Road, Sheffield, 10. 2 p.m.

New Companies Registered

Hunter Beattie Products, Ltd. 20,894. (Edinburgh.)—Private company. Capital £5,000 in 5,000 shares of £1 each. To carry on the business of manufacturing, research, dispensing and analytical chemists and druggists, etc. Directors: Hunter Beattie, 25 Monteith Row, Glasgow, S.E.; Mrs. Susan Beattie. Registered office: 2 Morris Place, Glasgow, S.E.

Bodio Metals, Ltd. 348,700.—Private company. Capital £1,000 in 1,000 shares of £1 each. To manufacture and deal in, and act as brokers and agents for the sale and purchase of ores, metals, minerals, precious stones, chemicals and chemical products, fertilisers and fertilising and vegetable products; to carry on business as chemists, analysts and assayers, etc. Subscribers: Anthony A. Martineau, 18 Austin Friars, E.C.; Robert H. R. McGill.

Colour Industries, Ltd. 350,916.—Private company. Capital £10,000 in 10,000 shares of £1 each. To carry on the business of prospectors, quarrymen, miners, manufacturers of ochres and dealers in crude and manufactured earths, ochres and oxides, manufacturers of and dealers in colours, dyes, etc. Directors: Norman S. Kinnersley, The Homestead, Wells Way, Keynsham; Chas. M. Beavis, Lt.-Col. Owen H. Bayldon, Henry W. Beavis, Albert H. Orchard, Comdr. Robert C. Bayldon.

Bourne Chemical Industries, Ltd. 350,308.—Private company. Capital £7,500 in 7,500 shares of £1 each. To carry on the business of manufacturers, exporters and importers of and dealers in metals, metal ores and compounds, metal goods and wares, manufacturers of and dealers in chemicals, gases and disinfectants, dyes, pigments, etc. Directors: Lt.-Col. Viscount Bridgeman, M.C., 113 Sloane Street, W.1; Horace J. Bowley, Herbert O. Sherman. Registered office: 7-8 Great Winchester Street, E.C.2.

Edward Howard (Manufacturing Chemists), Ltd. 349,381.—Private company. Capital £100 in 100 shares of £1 each. To carry on the business of manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum plasters, disinfectants, fertilisers, oils, colours, glue, varnishes, dyes, toilet requisites, photographic apparatus and materials, etc. Directors: *Jacob Natham Rose, 182/4 Old Kent Road, S.E.1; Walter Green. *Name appears in Articles of Association as "Jack Rose." Registered office: 184 Old Kent Road, S.E.1.

Lionite Chemical and Asphalt Products, Ltd. 350,352.—Private company. Capital £1,100 in £1 shares (600 "A," 400 "B," and 100 "C"). To carry on business as manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum, plasters, disinfectants, fertilisers, oils, colours, glues, roofing-felts, damp-courses, concrete, asphalt, bitumen, tar macadam, etc. Directors: Godfrey H. Owtram, Thistleton Cottage, near Kirkham, Lancs.; Felix Lowbeer, Richard Rubsch. Registered office: Treforest, near Pontypridd, Glam.

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